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This magazine is published to promote sound thought upon and concerning industrial medicine and traumatic surgery. To that end it will contain articles, news items, reports, digests, and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited. The editors will exercise care in checking on the accuracy of data printed but in all other respects articles and opinions of which expression is allowed are the opinions of their authors—the editors reserving in all cases the right to comment on the same in the current or any subsequent issues as they may be inclined.

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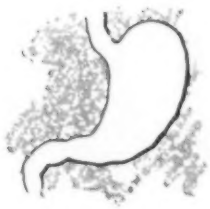

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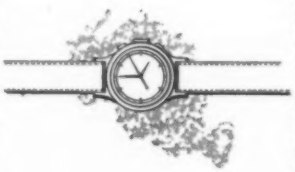

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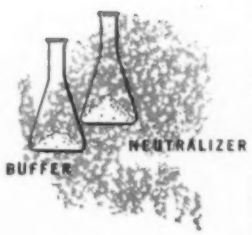

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FOUR key members of Eastman Kodak Company's medical staff in Rochester started the new year with new titles. They are: DR. JOHN L. NORRIS, director of the Kodak Park Medical Department; DR. JAMES H. STERNER, associate medical director of Eastman Kodak Company; DR. GORDON M. HEMMETT, director of Hawk-Eye Works Medical Department; DR. RUFUS R. CRAIN, director of Kodak Office and Camera Works Medical Department. DR. WILLIAM A. SAWYER, medical director of the company announced that DR. NORRIS succeeds DR. BENJAMIN J. SLATER, who died on December 4, as director of the Kodak Park Medical Department.

DR. NORRIS, a native of Dorchester, Massachusetts, is a graduate of Dartmouth College and McGill University. He was an intern at Genesee Hospital in Rochester from 1931 to 1933. After private practice in New London, New Hampshire, for four years, he joined the medical department at Kodak Park in 1937. Since 1939 he has been assistant superintendent of the department. In addition to membership in medical societies, DR. NORRIS has been treasurer and is currently vice-president of the Medical Society of the County of Monroe; has served as director of the New York State Society of Industrial Medicine; and as instructor in industrial medicine at the University of Rochester School of Medicine. He is a fellow of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, and a member of Theta Chi fraternity and of the Rochester Chamber of Commerce. He is now in his third two-year term as president of the Kodak Park Athletic Association. He is a member of the staffs of Strong Memorial Hospital and Rochester General and Genesee Hospitals.

DR. STERNER, a native of Bloomsburg, Pennsylvania, was graduated from Pennsylvania State College, where he majored in chemistry, and Harvard University Medical School. He interned at Lankenau Hospital in Philadelphia, serving as chief resident physician there from 1934 to 1936. In July of that year he joined the Kodak Park

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medical department and became an assistant superintendent of the department in 1939. In 1942 he acted as consultant and then planned the organization of the medical department at Holston Ordnance Works in Tennessee. In 1943 he investigated industrial hygiene problems connected with the Clinton Engineer Works' project, later organizing the medical department there. He was medical consultant in July, 1946, at the underwater atomic bomb explosion at Bikini. He is a member of various medical societies, has been on the executive committee of the Rochester section of the American Association for the Advancement of Science, and is a member of the Rochester Academy of Medicine, the Rochester Tuberculosis and Health Association and the American Chemical Society, and is currently medical consultant of the Division of Biology and Medicine of the Atomic Energy Commission. As an authority on industrial medicine and director of Eastman Kodak's industrial medical laboratory, he has served as instructor in industrial medicine and toxicology at the University of Rochester School of Medicine. He was elected president of the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION in 1947. He is on the staffs of Strong Memorial Hospital and Rochester General Hospital.

DR. HEMMETT was born in the Philippine Islands where his father was on duty as an Army officer. He spent his boyhood at Crown Point on Lake Champlain and at Glen Falls, New York. He was graduated from Cornell and McGill University and interned at Rochester General Hospital where for a year he was resident physician before entering private practice. He joined the Kodak Park medical staff in 1941, transferring to Hawk-Eye in 1943. At Hawk-Eye he set up the plant medical department on a full-time basis and was chief physician in the department. A member of various medical societies, he has served as chairman of the Health Education Committee, Medical Society of the County of Monroe; as vice-president of the Rochester Chapter, National Vocational Guidance Association; and as a member of the Rochester Pathological Society and the Mental Hygiene Society of Rochester. He has been active in the Rochester Chamber of Commerce, serv-

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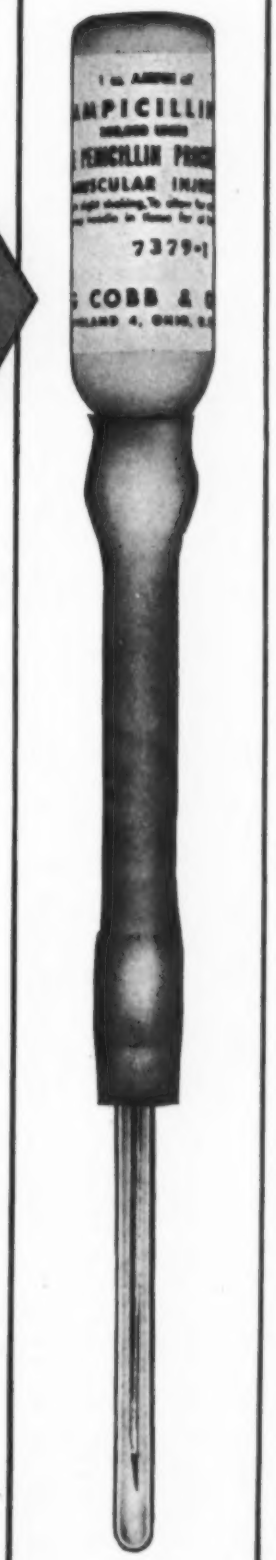

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American Association of Industrial Dentists, 4604 South helsea Lane, Bethesda 14, Maryland. V. J. FORNEY, D.D.S., Secretary-Treasurer.
April 6-7, 1949; Detroit.

American Association of Industrial Nurses, 654 Madison Ave., New York 21, N. Y. GLADYS L. DUNDORE, R.N., Executive Secretary.
April 5-9, 1949; Detroit.

American Association of Industrial Physicians & Surgeons, 28 East Jackson Blvd., Chicago 4, Ill. EDWARD C. HOLMBLAD, M.D., Managing Director and Treasurer.
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American Association of Railway Surgeons, 547 West Jackson Blvd., Chicago 6, Ill. CHESTER C. GUY, M.D., Secretary.
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American Chemical Society, 1155 Sixteenth St. N.W., Washington 6, D. C. A. H. EMERY, Secretary.

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American Conference of Governmental Industrial Hygienists, U. S. Public Health Service, Washington, D. C. J. J. BLOOMFIELD, Secy-Treas.
April 2-5, 1949; Detroit.

American Industrial Hygiene Association, 4400 Fifth Ave., Pittsburgh 13, Pa. HENRY F. SMYTH, JR., Executive Secy.
April 5-7, 1949; Detroit.

American Medical Association, Council on Industrial Health, 535 North Dearborn St., Chicago 10, Ill. CARL M. PETERSON, M.D., Secretary.

ing as chairman of the Safety Council's Home Safety Committee; president for two terms of the Health Council; and a member of the Chamber's Health Education Division of the Council of Social Agencies. He is a member of the Rochester General Hospital staff.

DR. CRAIN was born in Richfield Springs, New York. He is a graduate of Albany Medical College of Union University and holds the degree of Master of Public Health from the Harvard University School of Public Health. He interned at Albany Hospital and later taught medicine at Albany Medical College for two years before entering private practice in Cornwall, New York. During World War I, he was a captain attached to the British Expeditionary Force in France and Belgium and was awarded the British Military Cross in 1918. He joined the Kodak Office medical staff in 1920. In addition to membership in various medical societies, he is a fellow of the American Medical Association, and has also served as a member of the American Heart Association; as chairman, intermittently from 1928, of the cardiac committee of the Medical Society of the County of Monroe; and as secretary and treasurer of Industrial Workshops, Inc. He is author of numerous publications on heart disease, and has served as an instructor in medicine at the University of Rochester Medical School. He is an associate physician at Rochester General Hospital and on the staff of Strong Memorial Hospital.

American Medical Association, 535 North Dearborn St., Chicago 10, Ill. GEORGE F. LULL, M.D., Secretary & General Manager.

American Public Health Association, 1790 Broadway, New York 19, N. Y. REGINALD M. ATWATER, M.D., Executive Secretary.
November 8-12, 1949; Boston.

Association for the Surgery of Trauma.

Canadian Public Health Association, Vancouver, B. C., Canada.

Council on Industrial Health, American Medical Association; Secretary: CARL M. PETERSON, M.D., 535 N. Dearborn St., Chicago 10. Congress on Industrial Health, January 18-19, Drake Hotel, Chicago.

Industrial Hygiene Foundation of America, 4400 Fifth Ave., Pittsburgh 13, Pa. JOHN F. MCMAHON, Managing Director.
November 17-19; Pittsburgh.

International Association of Industrial Accident Boards & Commissions, MARSHALL DAWSON, U. S. Dept. of Labor, Washington, D. C., Secy-Treas.
September 12-18; New York.

Lead Industries Association, 420 Lexington Ave., New York 17, N. Y. ROBERT L. ZIEGFELD, Secretary-Treasurer.
November 15-16; Chicago.

National Council on Rehabilitation; Secretary-Treasurer: MR. HOLLAND HUDSON, 1790 Broadway, New York 19.

National Metal Congress, Philadelphia.
October 25-28; Philadelphia.

National Rehabilitation Association, 411-7th Ave., Nashville 4, Tenn. LOUIS R. SCHUBERT.
December 6-10, 1948; Madison, Wis.

National Safety Council, 20 North Wacker Drive, Chicago 6, Ill. NED H. DEARBORN, President; CARMEN FISH, Secretary.
October 18-22; Chicago.

National Tuberculosis Association, 1790 Broadway, New York 19, N. Y. H. STUART WILLIS, Secretary.

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1. Carroll, G., and Allen, H. N.: J. Urol. 55: 674 (1946). 2. Merricks, J. W.: West Virginia M. J. 44: 157 (1948). 3. Scudi, J. V., and Duca, C. J.: J. Urol. (to be published).

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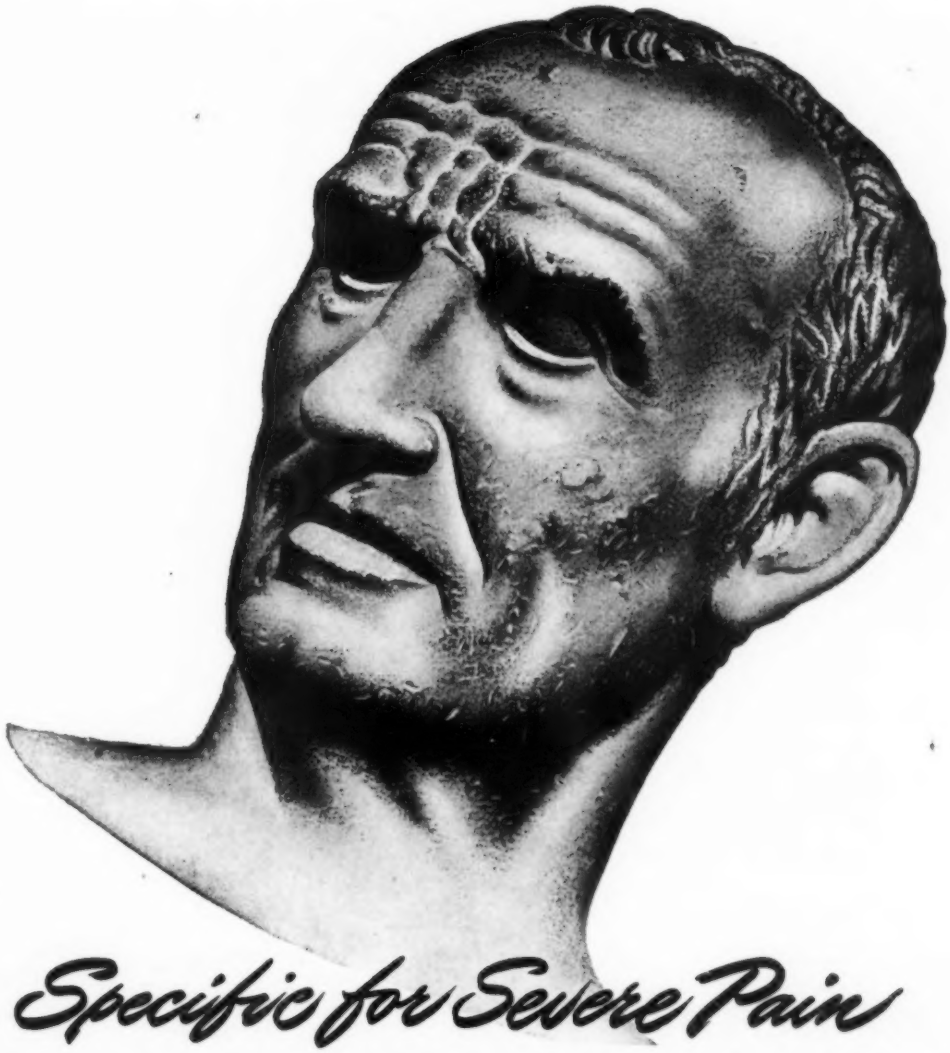

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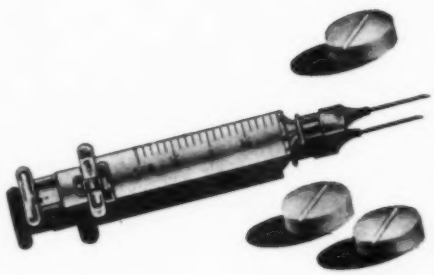

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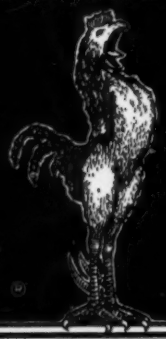

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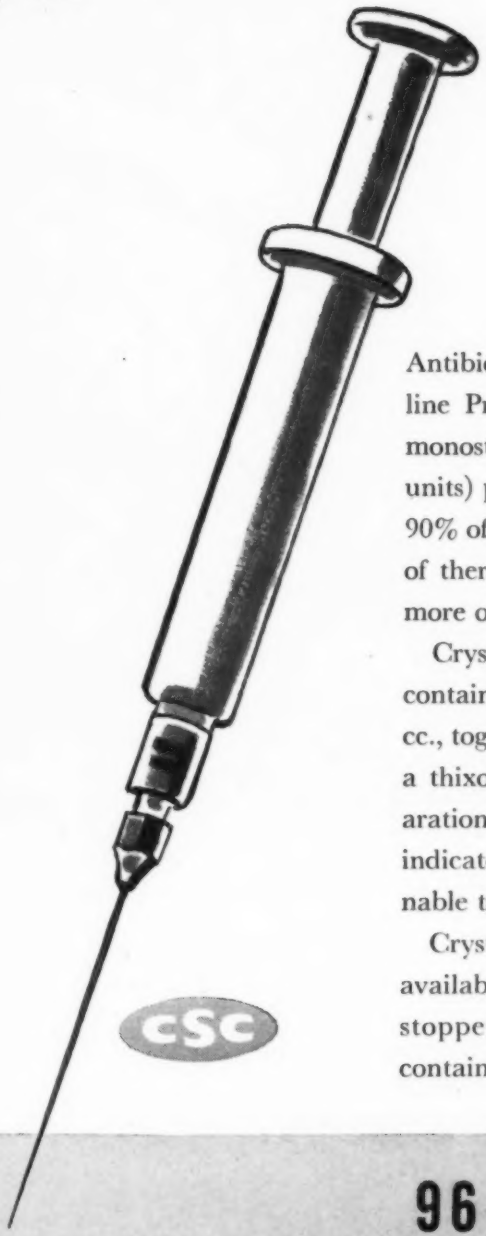

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1. Criep, Leo H., and Aaron, Theodore H., *Neohetramine: An Experimental and Clinical Evaluation in Allergic States*, The Journal of Allergy, Vol. 19, No. 4, pp. 215-224, July, 1948.

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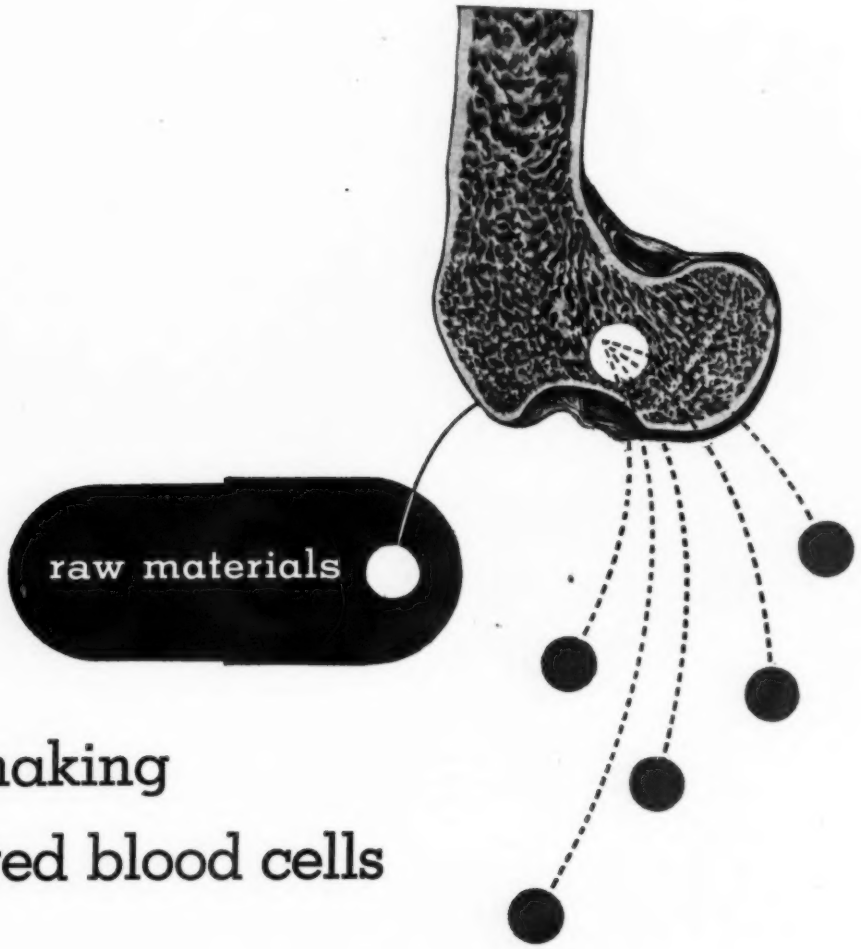

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INDUSTRIAL MEDICINE

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Surgical Treatment of Skull and Brain Injuries

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INJURIES of the scalp and skull may be accompanied by brain injury, but not necessarily so. Fatal injury to the brain may occur without any visible evidence of scalp or skull damage. These two axioms must be kept in mind in treating the head injury case.

One must also keep in mind that for practical purposes of discussion all head injuries may be divided, from a prognostic viewpoint, into three groups: (1) Those that have a head injury but obviously have no signs of cerebral damage; this is the completely rational, oriented and unshocked person. (2) The confused, disoriented, stuporous patient with or without signs of shock. Obviously this person has had a terrific systemic upset or has had a marked disturbance of the normal brain physiology. (3) Those patients with brains so badly damaged that no surgical skill or power on this earth can prevent death. The latter are like Humpty Dumpty—"All the king's horses and all the king's men can't put Humpty Dumpty together again."

The first group needs no treatment other than that of observing for signs of latent injury that may develop. The third group is obviously beyond help. The second group is where precision in diagnosis and treatment is all important to prevent mortality and morbidity. In this group needing specific care, a number of problems present themselves to be handled logically and skillfully. The manner in which they are handled determines success or failure in caring for the patient.

In the early management (first 24 hours) of head injury cases, one can almost completely disregard every aspect of the case except that of shock and the control of external hemorrhage. The treatment of shock from head injury differs not one bit from the treatment of any other type of shock. If in acute pain and conscious enough to feel it, then give morphine. There is no need to give morphine simply for shock alone. Give fluids by vein and blood transfusion if there has been blood loss. Forget about x-rays of the skull, intravenous 50% glucose, sucrose, or spinal puncture. Give caffein sodium benzoate, adrenalin, ephedrine or methedrine to raise the blood pressure. Keep warm and elevate the feet. Patients with a fast pulse and respirations, unconscious and with high fever are not surgical cases. Bleeding vessels must be stopped by suture at the bleeding point or by a tight pressure bandage, and nothing else is done until, and only until, the patient has recovered from shock.

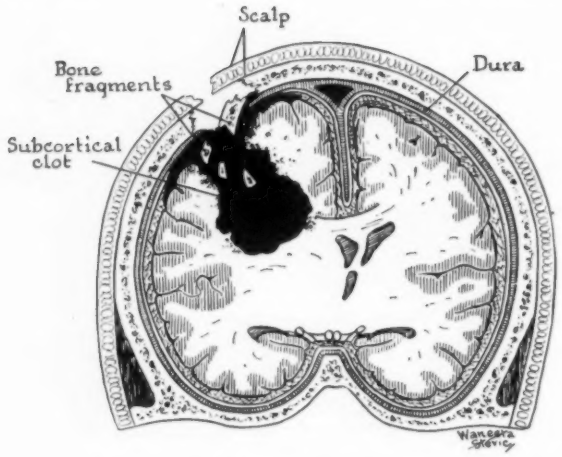
In the non-shocked patient, or when shock has passed, specific surgical measures can then be applied. Indeed, it probably would be a good rule never to operate on head injury cases during the first 12 hours except on those patients giving the classical symptoms of middle meningeal artery hemorrhage. There can be no serious objections to the immediate suturing of simple lacerations in an unshocked patient, but even here the surgeon in his haste to sandwich the emergency case into a busy day may be tempted to undertake an operation of considerable magnitude with an incomplete surgical set-up, without blood for transfusion, in an atmosphere of confusion, and without adequate preliminary observation of the patient. It is not surprising that immediate repair of head wounds leaves in its wake many unnecessary complications such as scalp infection, osteomyelitis, meningitis, brain abscess, and brain hernia.

Open Wounds of the Scalp, Skull and Brain

WOUNDS of the head, involving injury to the scalp, skull and brain, are often unaccompanied by any objective signs of serious shock or brain dysfunction. If these cases are properly cared for when first seen, there is little need to expect late complications. Poor treatment of these wounds results in serious, complicated problems which are seen too often by the neurosurgeon. After one has fully organized his anesthesia, the operating room, and has blood readily available for transfusion, then, and only then, should the operative procedure be undertaken.

A rather innocent-looking laceration of the scalp may, on adequate exposure of the wound, prove to be a deep, penetrating puncture carrying debris and extensive destruction to the deeper brain substance. One guiding principle must be constantly kept in mind in the treatment of such a wound. This principle is the complete eradication of all devitalized tissue and the removal of all imbedded foreign material in so far as is possible (Fig. 1). This can only be done with the operating set-up as described and with adequate skull and brain instruments, including the suction

Presented before the meeting of the Association of Surgeons of the Pennsylvania Railroad, at Virginia Beach, Virginia, October 30, 1948.



Compound Depressed Fracture of Skull with Bone Fragments and Blood Clot in Brain Substance

Fig. 1.

Diagramatic drawing showing penetration of the scalp, skull and brain with resulting imbedded bone fragments and blood clot in the subdural space and brain substance. Extraneous substances are often carried to the bottom of such a wound. All loose and foreign materials must be completely removed from such a wound by open adequate exploration and the skin closed over the skull opening

apparatus and electrocoagulator. Simple lacerated skin edges should be excised wherever possible, thoroughly washing out all foreign material. Broken pieces of bone entirely loose from the skull should be discarded. Macerated brain and debris within the brain laceration must be aspirated and thoroughly irrigated with salt solution. The repair of the dura is of little concern as long as one adequately cleanses the wound and removes all foreign materials. If there is a considerable loss of skin substance directly over a wound which reaches through the skull and dura into the brain cavity, then a pedicled skin flap of an adjacent portion of the scalp must be mobilized to fill the intracranial opening. A skin graft should then be taken from the thigh to fill in the area from where the skin graft was moved. At all costs, the intracranial opening must be covered with skin. Under no circumstances should an open wound which connects directly into the cranial cavity be left open. Whether or not drainage is left in the repaired compound fracture of the skull wound depends entirely on how clean the surgeon has left it. The closure of any hole left in the skull after removing fragments is undertaken some months after the injuries occur, and is not an immediate problem.

Subcutaneous and Subperiosteal Hematoma

HEMATOMAS occur beneath the scalp or periosteum of the skull. Those beneath the scalp are apt to absorb much more quickly than those beneath the periosteum. In either location, it is permissible to leave only the smaller hematomas in position for absorption. If they show little tendency to absorb, then a small incision should be made into them and the clot evacuated. To leave a hematoma beneath the periosteum favors infection of the blood clot and often leads to a subperiosteal abscess of huge size.

Subdural Hematoma

SUBDURAL hematoma is a frequent complication of either violent or trivial head injuries. In the acute form it may be a part of general brain laceration. In a chronic form a blood clot may exist between the brain and the dura for many months without producing profound symptoms, and without extensive brain laceration (Fig. 2). The history of such a lesion is commonly that of a rather hard blow to the head, but usually not one of sufficient force to cause a disturbance of consciousness. The patient is able to get up and about, suffers from an immediate headache, is slightly shocked, and often vomits. After a few days or weeks, the headache subsides and, while there is some head discomfort, this is not sufficient to attract any particular attention. After several weeks, headache continues and gradually increases in severity. At this stage the patient consults his physician because of this persisting, severe headache. No objective sign will appear, and the diagnosis must be made on the history as outlined. Later the patient will become somnolent, stuporous, and very suddenly go into coma. Operation is the only treatment and consists of making small trephine openings, not more than one-half inch in diameter, over the outer convexities of the cerebral hemispheres, and the evacuation of the fluid clots by irrigation.

A rapid and complete recovery is the rule after such treatment.

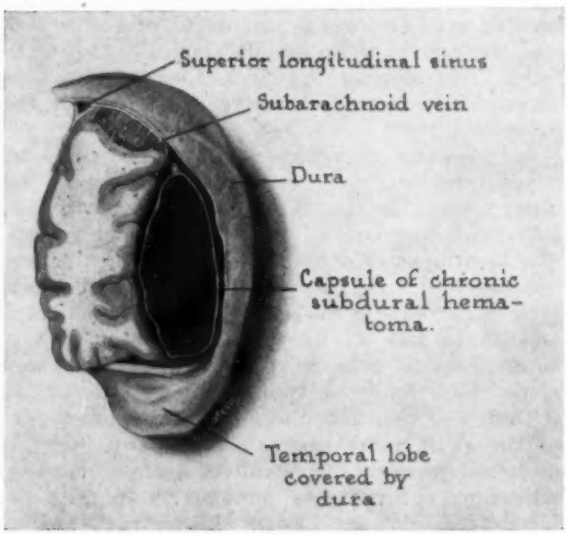
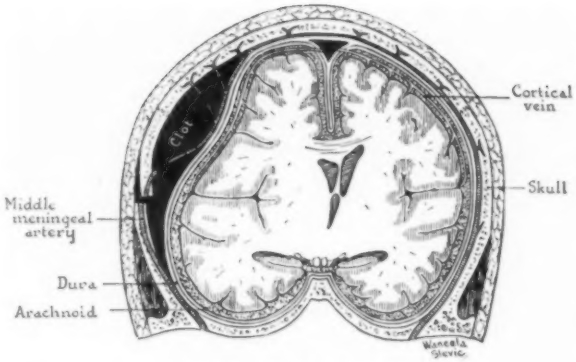


Fig. 2.

Chronic encapsulated subdural hematoma is found between the dura and brain and is due to rupture of a subarachnoid vein as shown, from head injury



Middle Meningeal Artery (extra-dural) Hemorrhage

Fig. 3.

Note hemorrhage just beneath the skull caused by a fracture of the skull which shears the middle meningeal artery

Middle Meningeal Artery Hemorrhage

A HEMATOMA from a hemorrhage of the middle meningeal artery has been given a prominent place in the textbooks of general surgery. As a matter of fact, this complication in skull fracture is extremely rare and is much less common than the subdural hematoma. The extradural hematoma forms between the skull and the dura and is caused by a fracture through the skull, usually in the temporal region which shears through the middle meningeal artery (Fig. 3). Since this artery lies between the dura and the skull, the hemorrhage pours out between these two structures and the dura is gradually stripped away from the skull as the hemorrhage increases in size. This stripping of the dura breaks away additional vessels from between the skull and dura, and the clot continues to increase in size until the entire dura may be stripped off the skull over one side of the head. Intracranial pressure then becomes so great that the patient develops a hemiplegia which is noted in its earliest stage as a weakness in the corner of the mouth and clumsiness of the hand movements. The patient also complains bitterly of headache and there may be vomiting. Paralysis of one side of the body progresses and the patient may become unconscious, with coma and death not far away if the blood clot is not promptly evacuated. The treatment of such a lesion must be immediate. Any delay permits the blood clot to increase in size, and death is certain to ensue. Any patient who has had a lucid period following a head injury and develops the symptoms mentioned must have an operation as soon as these symptoms are noted, and without the delay that may be permissible in other types of head injury. The clot is evacuated and the bleeding vessels controlled by either turning down a small flap in the temporal region or rongeuring out a hole in the skull about two inches in diameter. The clot is removed with suction and curettes, and the bleeding points are identified accurately and coagulated with the electrocoagulating machine. The evacuation of a middle meningeal artery clot and the control of the many bleeding points is a difficult achievement, even for the most experienced brain surgeon, and practically impossible for any surgeon not trained in neurosurgery. Many times there is an associated subdural hydrops or subdural hematoma which will require the dura to be opened to evacuate these collections of fluid. Early diagnosis of the condition with appropriate, skillful treatment should be life-saving if the treatment is not too long delayed.

Subcortical Hematoma

HEMORRHAGIC clots may occur in the substance of the brain owing to the rupture of a deeplying vessel. In this location, the hemorrhage may absorb brain fluid and gradually increase in size. Most often this type of lesion is indicated by increase in the intracranial pressure as shown by choked discs, headache, vomiting, and if the collection of blood is near the motor area of the brain there will be a hemiparesis or even a hemiplegia. If this lesion exists in the occipital lobe there will be a loss of vision to the opposite side from where the lesion resides. Given a patient after a head injury, who develops choking of the optic discs, headache, hemiparesis, or a homonymous hemianopsia, one must suspect a subcortical hematoma. These are treated by the turning down of a bone flap from over the lesion and the evacuation of the clot. The recovery from such a lesion following operation is quite frequently complete and spectacular.

Fractures Through the Sinuses or Ears

FRACTURES of the skull many times present problems because they occur in locations where they extend into the sinuses, middle ear, or mastoid process. Thus, they become compound fractures of the skull, since these cavities all contain air and are potentially germ-infested. With a fracture opening into these cavities, cerebrospinal fluid may escape from the intracranial fluid-bearing spaces if the dura mater has been ruptured. When the fluid escapes, air passes into the fluid-bearing spaces of the cranial cavity, and if x-ray pictures are taken at this stage, the contrast of the air in these spaces will be immediately noticed. Obviously, germs may readily pass into the intracranial cavity along with the air and thus meningitis or brain abscess may develop. The avoidance of such complications usually can be accomplished by the thorough and judicious use of the antibiotic drugs. If the fracture line is not too wide, the healing process may close the fistula in a few days. However, in some instances the fracture line may be so wide that it may never heal tightly closed. In these cases, cerebrospinal fluid drains into the back of the throat and can be noticed quite easily running from the nose, if the patient lies on the face. Meningitis will ultimately occur in these cases if something is not done to stop the cerebrospinal fluid leak, and any cerebro-

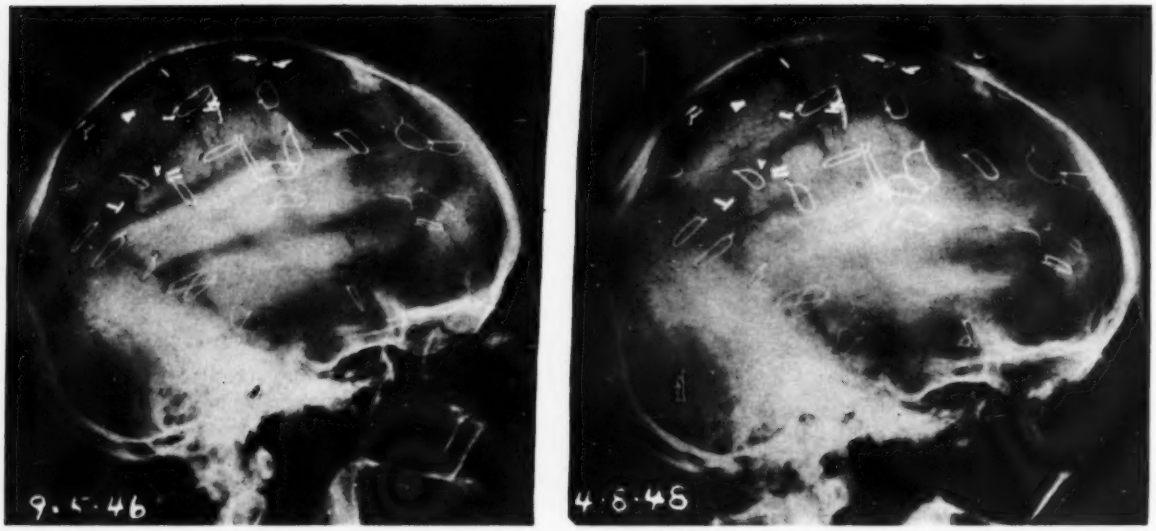


Fig. 4.
Showing effective closure of skull defect by tibial bone grafts. This type of cranioplasty is preferable to those using non-absorbable materials

spinal leak which has existed more than one month most certainly should have a craniotomy, the brain lifted, and the laceration exposed and closed with sutures or by the implanting of muscle fragments in the fracture line. The operative closure of such an opening is not too difficult and quite satisfactory.

Traumatic Delirium

PERSONS with head injuries often present difficult and varied mental problems, the commonest one being that of the traumatic delirium that is associated with diffuse brain injury. The patient may be so disoriented, irritable, noisy and violent as to disturb the entire hospital, and present a serious problems in nursing. Fortunately, few of these patients need surgical therapy. Blood clots, abscess or infections inside the cranial cavity invariably make the patient somnolent and quiet, so that one can be certain that a person who is agitated, active and mentally disturbed has no lesion requiring surgical therapy. These patients must be restrained to protect the nursing personnel. Proper fitting anklets and wristlets judiciously used are necessary. Heavy sedation with sodium amytal, paraldehyde, or even morphine at times is necessary. Frequently the delirium lasts for three to four weeks and is not incompatible with complete recovery of the patient.

Repair of Skull Defects

ALL DEFECTS of the skull which present an unsightly appearance, pulsate or unduly concern the patient, should be repaired. There is no good reason for post-traumatic patients to be going around with large, unsightly dents in the head. As soon as the skin and underlying tissues are softened and pliable following a head injury, the repair should be undertaken. It should not be delayed because of the danger of an anxiety neurosis developing in response to an unsightly defect in the skull. And, from the standpoint of possible litigation, particularly in industrial cases, the defect should be repaired because of the bad impression the patient's depressed scar makes on the court and jury.

The repair of bone defects in the skull has been accomplished by various methods. The one given the most publicity during the recent war and since that time has been the closure of the hole by means of tantalum plates. Stainless steel plates serve the same purpose and work quite as well as tantalum. However, any non-absorbable metallic plate is unreliable in living tissue, since the material can only be encapsulated and always lies there susceptible to any suppurative blood-stream infection. Again, the patient may develop a definite psychoneurosis because of the presence of a metallic body in the skull. Metallic substances always cast a dense shadow and sooner or later the patient will become informed of this fact when x-ray plates are taken of the skull. A more satisfactory way to repair post-traumatic defects is the use of lucite plastic material. This can be cut and shaped to fit the defect perfectly, is well tolerated by the patient, and is radiation translucent. Still better, these defects should be closed with bone grafts taken from the tibia. It is a fact that the largest defect in the skull can be completely closed with bone grafts taken from one or both tibia (Fig. 4). The edges of the bone fragments will smooth out and grow in such a way as to leave the skull surface appearing much as the natural surface of the skull and very firm. Better still, the bone is a part of the patient's body and there is no likelihood of him developing any psychoneurotic reaction through the implantation of such material. A satisfactory take of the bone grafts can be expected in practically 100% of all operative procedures of this type.

Post-Traumatic Headache

HEADACHE following injury to the skull is common as the immediate effect of such an injury. This is usually due to bruising of the scalp or periosteum of the skull, but if it is persistent and widespread over the cranium, one must suspect subdural hematoma. However, in many instances, no notice is taken of a head discomfort until some weeks, months or even years have passed, and then the patient becomes aware of peculiar headaches which come on at irregular intervals and last from several hours to several days. These headaches are frequently followed by nervousness and nausea. If one carefully analyzes this group of headaches it will be found that these headaches occur in individuals who are part of a migrainous family, and if one more closely analyzes the discomfort, it will be found that they develop not immediately following the head injury but some weeks or months later, and, as a matter of fact, have no direct time relationship to the injury. Close investigation will disclose the fact that this individual has had some headache over many years prior to the head injury and the head injury itself at most only accentuated a pre-existing migraine and did not actually cause the headache. In fact, many times it is questionable whether or not the injury had anything to do with increasing the severity of the discomfort.

Post-Traumatic Psychoneurosis

POST-TRAUMATIC psychoneurosis is another problem which is often baffling to both the patient and the physician. Severe injury is always accompanied by shock to the nervous system in some degree, but such shock is always transitory and when so-called post-concussion shock continues for months and years in a person who had no evidence of actual brain damage, one will usually find that the condition is actually a litigation malingering. It has been proved by many thousands of cases in our two great wars of recent years that "shell shock" existed without actual anatomic damage to the human body or brain. It even occurred before the soldier was in combat or had actually heard an enemy's gunfire. These patients always get well when removed from the strain of military life. Those who have had "shell shock" for year after year are now known to be nothing more or less than cases of dementia praecox. All cases of true traumatic shock completely recover in a relatively short time.

Post-Traumatic Psychosis

PERSONS with extensive lacerations of the brain who have a stormy convalescence with much confusion, delirium or stupor, may recover physically but have late residuals of such brain damage. This may be manifested by minor degrees of mental incapacity to complete or partial, permanent disorientation and confusion. These are the true cases of traumatic psychosis. The ultimate recovery state in traumatized brain cases should not be evaluated for some months after brain injury, as many of these cases which are seemingly hopeless clear up entirely. Others have only slight residuals and none has the so-called post-traumatic shock syndrome.

Conclusions

IT IS WELL to emphasize the necessity for the conservative, immediate treatment of head injury, the treatment of shock by already well-known methods and the importance of a thorough debridement of all wounds only after the patient's state has been accurately evaluated and the operative facilities have been thoroughly organized.

The problems of deep, penetrating wounds of the brain, subdural, extradural and subcortical hematomas are problems for the neurosurgeon, but their general nautre must be recognized by the traumatic surgeon.

Bone defects in the skull should be repaired by bone graft, if possible, when they are unsightly.

Compound fractures must receive adequate antibiotics for at least three weeks.

Post-traumatic shock is actually malingering when it is prolonged for any great length of time.

Chronic post-traumatic headache is not a clinical entity.

Post-traumatic psychosis may exist in those having suffered severe lacerations of the brain with prolonged mental incapacity at the time of the injury.

Early Appearance and Rapid Development of a Large Ventricular Aneurysm

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Medical Director, Union Health Center,
International Ladies' Garment Workers' Union,
New York

A CASE appeared at this industrial ambulatory health center which deserves reporting because of the observation of rapid enlargement of a ventricular aneurysm in a textile garment worker who is carrying on his regular employment, involving constant physical effort, with but little complaint.

The cardiac clinic at which this case was observed is composed of cases which have electrocardiographic patterns of coronary infarction. Although many of the workers treated at the clinic did not report having had an actual attack of acute coronary thrombosis, the electrocardiographic, x-ray and clinical findings classify them as victims of coronary disease and point to evidence of pathological changes in coronary vessels and myocardium, with the numerous attending symptoms and physical signs.

In this particular case the patient had not been in attendance at the Health Center for 12 months. On his return for medical care he was given a review examination which included a routine 70 mm. chest x-ray film. The miniature x-ray showed a large ventricular bulge which, together with the electrocardiographic record and review of previous findings in his medical chart, brought an invitation to the patient to attend the cardiac clinic.

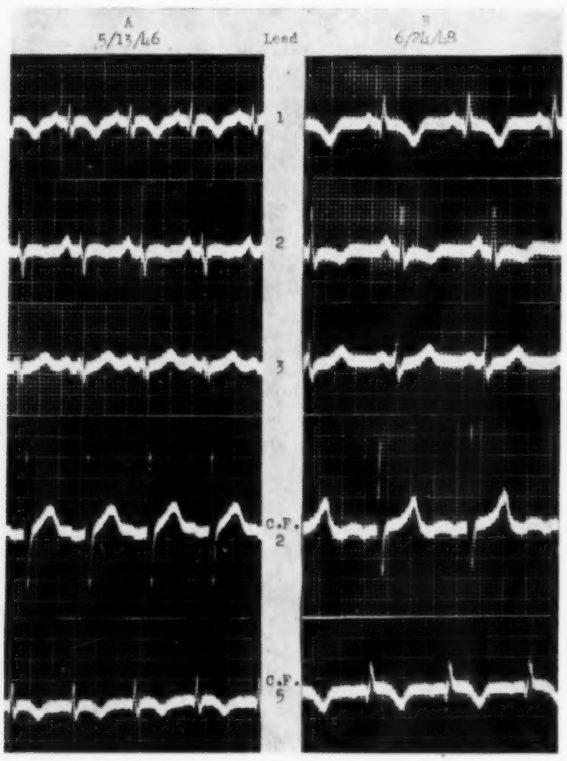

Fig. 1.

(A) Electrocardiograph taken 5/13/46, 54 days after the diagnosis of acute anterior wall myocardial infarction. (B) Electrocardiograph taken 6/24/48, two years and three months after heart attack

Anamnesis

AN ADULT male appeared on July 13, 1948, with the following complaints: At times he experiences an annoying pain which lasts from five to 10 minutes over the precordium, not always related to effort. He finds it is less troublesome when at work. The pain is not accompanied by shortness of breath or palpitation. No medication had been taken for about a year's time.

He describes a slight "cigarette cough." There is urgency and frequency during the periods when not working and occasional nocturia which interferes with his sleep. Constipation for a number of years has been helped by oil emulsion. His diet is sparing and he avoids salts; consumes two cups of coffee daily and smokes 20 cigarettes, which relieve his nervousness; consumes a glass of beer daily and a jigger of whiskey.

History of Heart Attack

ON MARCH 20, 1946, at about 5:00 P. M., while completing a day's work, he felt unwell. There was stiffness and pain in the two middle fingers of his left hand. However, he traveled

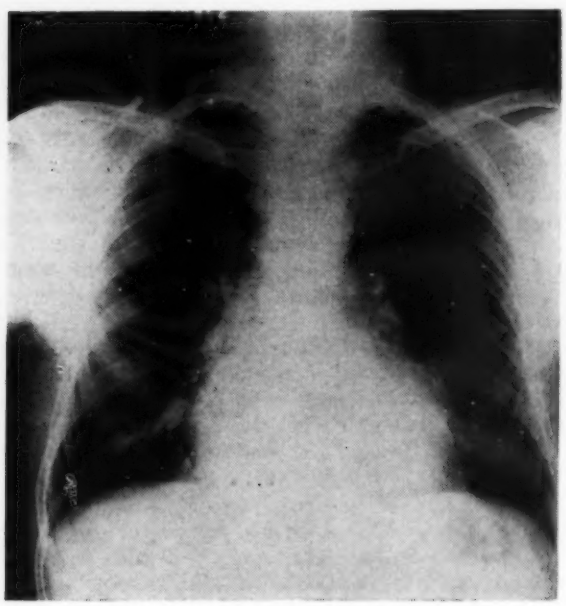

Fig. 2.

Teleoroentgenogram taken 54 days after heart attack, showing slight ventricular aneurysmal bulge on the left border of the heart

home for about an hour on the crowded subway train. When he arrived home an uncomfortable pressure appeared substernally. He called a physician who responded at about 5:00 in the morning. The attending physician summoned a cardiologist who thought that he was suffering from an acute attack of coronary thrombosis and recommended bed rest with conservative home treatment by his private physician.

He remained in bed four weeks, after which he felt sufficiently well to come to the Health Center for examination to secure disability insurance. The electrocardiograph showed the presence of a recent anterior wall infarction (Fig. 1); the teleorentgenogram showed a small aneurysmal bulge (Fig. 2).

He remained at home for an additional five weeks and then spent four weeks more at a rest home. In all, a 13-week period was passed under medical supervision. He remained away from work for nine months to the end of 1946.

At that season of the year there is little work in this industry and therefore he was only able to secure employment for one, two, or at most three days weekly. This industrial situation lasted for another period of six months when full production was resumed and he was employed steadily for six months. The seasonal slump again appeared and he had an enforced vacation. For the following six months he again worked a few days weekly.

At his last visit to the Health Center, August 10, 1948, he had been employed steadily for six weeks and expected three more weeks of full employment, after which he would be able to work only a few days weekly. At his last visit he felt well, with minor complaints. The patient is reluctant to seek other type of work, in spite of knowing the danger to his health entailed by his present occupation, because he feels that he will be confronted with financial difficulties and adjustment problems.

Physical Examination

A SHORT, well nourished white male aged 56; weighing 134¼ pounds; height 63 in.; temperature 97.4°; pulse 84; blood pressure 120/84 on right arm, seated. Repiration 28 seated. Alert and active in movements and speech. Slightly cyanotic lips.

Neither the apex beat nor heart impulse is palpable. The heart sounds are muffled but are of fair quality at the apex. The first sound equals the second in intensity. On one occasion a faint systolic murmur was localized at the apex. The sounds at the base of the heart are faint, the first and second sounds are equal in intensity. There is no difference in quality between the aortic and pneumonic sounds.

Broncho-vascular breathing with some mucous rales, is heard on ausculation of lungs. Neither the liver nor the spleen is palpable and there is no edema of the extremities. Fluoroscopic examination shows moderate pulsating movement of the bulge along the left heart border (see Fig. 3) which is synchronous with the pulsation of the left ventricle. The size, shape and depth of the aneurysm are shown in the teleoroentgenogram taken 6/24/48 (see Fig. 4). Laboratory findings show nothing remarkable; blood serology is negative.

Fig. 3.
Teleoroentgenogram taken 6/24/48 showing increase in the ventricular aneurysmal bulge, two years and three months after the diagnosis of an acute anterior wall myocardial infarction

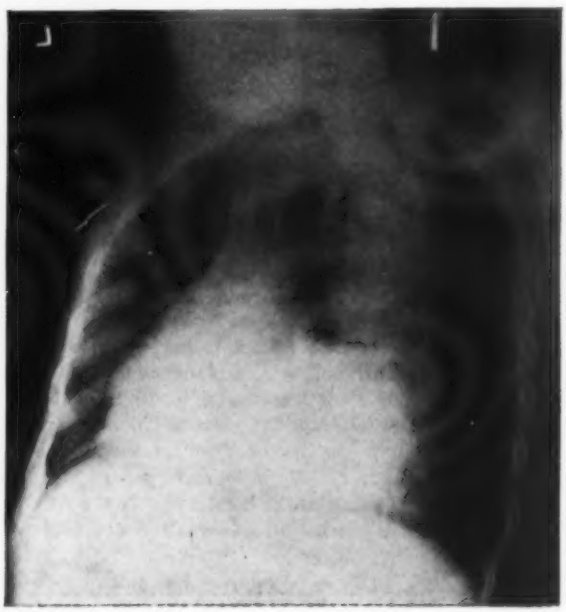

Fig. 4.
Left anterior oblique position teleoroentgenogram taken 6/24/48 showing the ventricular bulge encroaching upon the shadow of the spinal column, two years and three months after the diagnosis of an acute anterior myocardial infarction

Working History

THE patient has worked as an operator of a "hand-knitting" machine for 40 years, with a 10-year period of absence, during which time he was an insurance agent. He is employed on the basis of production and therefore his earnings depend on his skill and speed. The industry is highly seasonal and develops a sense of insecurity for the job as well as for earnings.

The patient lives at a distance of one hour's ride by subway travel from the factory. An additional 15 minutes' walking is necessary from the transit points. He has an elevator available at home and at the factory; the only stair climbing he must do is the 31 steps of the subway stairs.

Description of Craft

A "HAND KNITTING" machine requires constant movement with both hands holding levers which require pushing and pulling operations. Every eight to 10 minutes there is a maneuver where these movements cease and the operator directs his attention to a manipulation of the needles which fashion the design on the cloth of the garment. The interruption takes about half a minute at most and is considered restful. The operator stands constantly except for this interruption during the 10-minute period when he sits for 10 or more seconds and adjusts levers and pulls the manufactured garment out of the machine. He then bends down to pick up yarn which weighs between four and six pounds. The work is carried on in artificial light and there is considerable noise from the constant roar of many power machines.

Family History

THE patient's father died at the age of 70; his mother at 85, causes unknown. There is no record of heart disease in siblings. One brother died at 85, cause unknown. The patient is married, wife living and well, and has two adult children.

Summary

A VENTRICULAR aneurysmal bulge was discovered 54 days after the diagnosis of an acute anterior wall myocardial infarction. In two years and three months time a large ventricular aneurysm developed, with the patient continuing hard work with only mild symptoms.

Just What *Is* Free Enterprise?

IT HAS nothing to do with politics nor wealth nor class. It is a way of living in which you as an individual are important. Little things make up this way of living, but think what you would lose if you ever surrendered it:

Free Enterprise is the right to open a gas station or grocery store or buy a farm, if you want to be your own boss, or change your job if you don't like the man you work for. (Under communism you work where you're told, and you live and die bossed by hard-fisted bureaucrats who tell you every move you dare make.)

Free Enterprise is the right to lock your door at night. (In communist countries the dread secret police can break it down any time they like.)

Free Enterprise is the right to argue. (In communist countries you humbly say "Yes" to whatever is told you.)

Free Enterprise is the right to save money if you want, or blow it on a good time if that's what you prefer. (Under communism you'd never have the money to do either—back-breaking hours earn you only enough to keep alive.)

Free Enterprise is looking on a policeman as someone to protect you, on a judge as a friend to help you. (In communist countries you had better be afraid of all police. . . .and dread all judges and courts.)

Free Enterprise is the right to raise your children as you think best. (Under communism the state decides what your child shall learn and do, where he or she shall go. Respect for parents, and family life, are held in contempt.)

Free Enterprise is the right to speak freely about anything you wish. (In communist countries you can never know whether your best friend or your own child is an informer. You are told what opinions to have; you'd better not voice any others.)

Free enterprise has nothing to do with how much money you have or don't have, nor what your job is or is not. Free enterprise means the right to *be yourself* instead of some nameless number in a horde bossed by a few despots. Free enterprise is the sum of many little things—but how miserable you'd be if someone stole it from you!

—Advertisement, Warner & Swasey, Cleveland, in *Business Week*, January 1, 1949.

Industrial Medical Education

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AN INCREASING number of comments relating to education in the field of industrial medicine, are being published. Recently in Argentina,[1] Italy and Great Britain[2] medical educators have been urged to provide adequate facilities for specialized post-graduate training in this field. Since the war four medical schools in this country (University of Pittsburgh, University of Cincinnati, New York University and the University of Colorado) have been developing full time training programs in this field, and a number of others have provided short post-graduate refresher courses for the past several years. The American Association of Industrial Physicians and Surgeons and the American Academy of Occupational Medicine, together with the Council on Industrial Health of the American Medical Association, are committed to the task of trying to incorporate a Specialty Board of Industrial Medicine. By that act they assume some responsibility for promoting adequate training facilities through which candidates may become eligible for certification by such a board.

These activities, plus the very real possibility that the 81st Congress of the United States may give serious consideration to a program of socialized medicine, have created the demand for a review of the educational needs and capabilities of this country as regards industrial medicine. If the job is not adequately done by the medical profession within the fabric of existing facilities or through the creation of additional facilities which can work harmoniously with our other training programs in medicine, others less capable may see fit to direct what shall be done.

An adequate training program for a career in industrial medicine must of necessity be built around the functions which the medical departments of industry may reasonably be expected to perform and must fulfill the purposes of these functions from industry's point of view. Kehoe[3] has defined the functions of the medical department in industry as follows:

1. To promote the health of industrial workers.
2. To reduce the economic losses of wage earners and employers occasioned by physical inefficiency, sickness and injury.
3. To study the basic environmental conditions of employment and the reactions of workmen thereto so as to reduce handicaps and hazards and to place individual workmen in the most suitable jobs.

Another definition of these functions adapted from the ideas of Grant, of the International Health Division of the Rockefeller Foundation includes:

1. The promotion of physical, mental and emotional health.
2. The prevention of physical, mental and emotional disease.
3. The diagnosis and treatment of physical, mental and emotional disorders incident to occupation.
4. The rehabilitation of the handicapped and injured.
5. Investigation into those phases of industrial and social practice and procedure which relate to human productivity while at work.

Either definition describes the job adequately. The purpose of that job is to promote optimal productivity of all employees at all times.

The curricula of our medical schools do not provide adequate training for this specialized form of medical practice. The residency systems of our hospitals likewise fail to provide the necessary training for those phases not concerned with the diagnosis and treatment of occupational injury and disease. It is therefore necessary to create adequate training facilities within the fabric of existing educational facilities so far as possible, and to coordinate the other essential facilities with them. The following discussion of the requisite training program is based upon three assumptions which are believed to be valid. They may be stated as follows:

1. Industrial physicians must first be excellent doctors.
2. Diagnostic and curative medicine is best learned at the bedside, surgery is best learned at the operating table, and industrial medicine is best learned in the factory.
3. All specialized training requires a period of re-orientation in the basic sciences and additional study of pertinent fundamentals which can be provided most adequately in university medical centers.

Undergraduate Training

UNDERGRADUATE training in medical schools alone, can no more be expected to provide adequately trained specialists in industrial medicine than it is expected to provide internists, surgeons, pediatricians, or gynecologists. It must, however, provide a certain number of students with an interest in industrial medicine, and acquaint all students with the importance of this field of professional activity and its impingements upon general medical practice and problems of community health. If these objectives are accomplished, a sound general foundation will have been laid for the further study of this branch of medicine.

The curriculum of the undergraduate medical school is already overcrowded. If it is to be criticized seriously, from the standpoint of sound pedagogy, its faults lie in the thinness of its coverage of too great an area, rather than in too much restriction of the latter. The solution does not lie in adding more courses, nor will it be found in providing courses taught by men whose experience in the industrial field of medical practice is slight or nil. The catalogue hours of teaching devoted to industrial medicine are not, and probably never will be, a measure of the adequacy of undergraduate training.

A single clinical example, which makes a deep impression upon the student, may be of more value than 15 hours of didactic work or 10 field trips.

Sixty million persons in the United States of America are gainfully employed. Probably well over 10% of their illnesses have their origin, to a greater or lesser extent, in some aspect of that third of their lives spent at work. The whole medical curriculum must be revamped somewhat to include specific impressive examples from this phase of human illness and disability. The teachers of anatomy, biochemistry, and physiology, as well as those of pathology, medicine, and surgery must include in their teaching examples of medical problems in industry. These examples should appear in every course in medical school, not in proportion to the type of practice medical men have had in the past, but rather in proportion to the apparent and manifest needs of the present day community. It is wrong for the pharmacologist to direct all of the attention of the student to the toxicology and pharmacodynamics, when some knowledge of the toxic effects of dry cleaning fluids, organic solvents and a variety of vapors, metallic fumes and finely divided dusts, is demanded of almost every doctor. It is an evidence of narrowness of vision and of inexperience on the part of the physiologist to ignore the environmental factors of heat, cold, noise, light and visual demands, vibration, posture, stretching, repetitious mechanical exertion and mental effort, and the effects of these and other factors upon performance, when a large segment of the population is subjected to such physiological stresses during the productive hours of their lives. Nutrition cannot be taught adequately without simultaneous consideration of work. Sanitation does not apply alone to sewage disposal systems but also to locker and shower rooms, industrial cafeterias, industrial clothing and protective equipment and to the atmosphere of work rooms. Otorhinolaryngology taught without reference to fumes and dusts, including those encountered daily in some form or other by all workmen and most unemployed persons, is somewhat less than adequate.

Three-quarters of all skin disease probably has its origin in some connection with the patient's employment. Orthopedic disease and trauma are, by their very nature and etiology, intimately associated with work. Obviously, many other examples could be cited.

The problem of undergraduate education in relation to industrial medicine is therefore not so much a matter of more courses or more hours (though these should be improved), as it is one of orientating the pedagogic viewpoint so as to direct proper emphasis toward this aspect of medical practice. Those who are familiar with the field will have to provide the proper data for many of the examples used, since the instructors in anatomy, physiology and other subjects, while wholly willing to use them, may not know of them or where to find them.

Post-graduate Residencies and/or Fellowships

THE requirements imposed upon the modern specialist in industrial medicine are so great that there is no hope of his meeting them without access to post-graduate training similar in scope, intensity and duration to those now available in internal medicine and surgery.

The first professional requisite of a good industrial physician is that he be a competent doctor. Since such competence is developed in internships and junior residencies (or by equivalent experience), the specialized training in industrial medicine must be preceded or accompanied by sound clinical training on the wards and in the outpatient clinics of accredited hospitals. Subsequently, or simultaneously (clinical skill must be maintained through its exercise), special training in those phases of industrial medicine not common to other types of medical practice must be provided. These are included under the following general headings:

1. Industrial Physiology and Toxicology.
2. Industrial Medical Practice.
3. Environmental Control.
4. Human Relations in Industry.
5. Industrial Medical Research.

The student cannot hope to cover this subject matter so as to acquire a working knowledge of its applications to any type of industrial organization, and to obtain adequate in-plant experience, in much less than three years of hard work. Furthermore the presently organized and equipped medical school cannot provide all of the facilities for such training. Such facilities must be coordinated with those of schools of engineering, law, business administration, and social relations, and with those of industry itself.

The practice of industrial medicine, we repeat, should be taught in the factory. Obviously, there are certain disciplines and principles which can best be taught in the schools and their laboratories, but the program cannot be complete and effective unless it includes satisfactory and ample in-plant training. To practice industrial medicine one must understand not only people and disease, but also industry as well.

Organized courses of training of the type envisaged above are now being offered in several medical centers, and a number of others are in the process of being planned. Certain industrial

medical departments are available, and others can be developed to provide high standards of professional training in the field in much the same manner that hospitals provide for a variety of other types of training. Likewise, the industrial physicians responsible for such training can be and probably should be members of the faculties of the schools which accept the responsibility for the planning and coordination of the entire program of specialized training.

The mechanisms and facilities for this type of training are available in many of the medical centers in the country, and only need coordination and implementation by competent interested educators. The cost of such programs will obviously have to be borne jointly by the universities and by industry.

The question naturally arises: "Should a specialty board be created to recognize this type of specialist?" Opinions will differ, no doubt, on this subject, but it would seem that the recognition of professional men in this field might better be based upon their knowledge and competence, and the fruits of their labors, rather than upon any artificial criteria. The latter seem unnecessary at this time. A board has never been needed to provide recognition of competent surgeons, but a sound program of training initiated by a board has provided better surgeons. Adequate training programs, not boards, will make better industrial physicians.

Be these things as they may, there are many who are determined to have a specialty board of industrial medicine, and it seems desirable, therefore, to outline a course of professional training which may serve the needs of future applicants for certification by such a board. The minimum training program, having, as its prerequisites, graduation from an accredited medical school and an internship in an accredited hospital, should include:

(a) A short period of *orientation* to familiarize the student with the history, nature and scope of the speciaty of industrial medicine.

(b) *Basic training* in physiology, biochemistry, toxicology, and pathology, as they apply to industrial medical practice.

(c) *Industrial medical practice* to include both practical experience and didactic training in the outpatient clinics of accredited hospitals and the dispensaries of accredited plants. Such clinics must include medicine (including dermatology and neurology), general surgery (including orthopedics and gynecology), psychiatry, ophthalmology and otorhinolaryngology. It should not be the aim of this phase of the program to train specialists in these fields, but rather to train a physician to recognize and properly treat those disorders of each specialty which may properly be treated in the plant dispensary, and to give him the capacity to recognize those disorders which need to be referred to specialists whose competence he can appraise.

(d) *Preventive medicine* in industry, including, at least, biometry (including vital statistics and records), epidemiology, industrial hygiene (methods of environmental study and control), mental hygiene, legal medicine in its special relations to industrial medicine, business administration (the pertinent structure and function of the modern community and its human relations), and engineering as it impinges upon industrial medical practice.

(e) *In-plant training* under the direct supervision of the medical director and staff of a plant approved for such training by the American Medical Association and the specialty board.

(f) *Research* work applied to the field of industrial medicine.

It will be apparent that the program outlined above does not coincide, even in part, with the first year of a course leading to a degree in public health as described by Shepard.[4] While there are similarities in broad principle in these two courses, they lead into different fields of practice, and it would seem highly wasteful of effort and of the already foreshortened years of the professional life of the industrial physician not to devote himself to work definitely oriented toward the problems of modern industry.

The successful completion of such training will merit some form of professional recognition. Whether or not a specialty board is created, the universities must give appropriate and formal evidence of their approval of those who have completed their training. Here, too, however, the worth of any degree or certificate granted will be measured eventually by the quality of the professional performance of those who hold it and not by any intrinsic qualities.

Refresher Courses

A LARGE group of physicians is drawn into industrial medicine without the training outlined above. They are compelled to find their way by the longer and harder method of trial and error. A still larger group of physicians in private practice will continue to see cases of industrial illness and injury, and will come to realize that they need specialized knowledge for this task. These will be greatly helped by post-graduate courses similar to those given by the American College of Physicians in the field of internal medicine. At most, such courses can hardly exceed six weeks in length either from the point of view of the teachers or the students. They should be made available annually in many parts of the country and the organizations responsible for them should be prepared to act in an advisory and consulting capacity to general practitioners and industrial physicians either directly or through reference to the proper authorities.

If a Specialty Board of Industrial Medicine is created, it will be necessary to provide the mechanism whereby men already in practice may acquire the necessary credentials to admit them to the examinations of the Board.

Refresher and post-graduate courses given by the universities should be but one facet of the

requirement. In-plant experience in an industrial medical department accredited by the Board should also be required. Obviously then the Board must define acceptable standards for industrial medical departments, as such standards are set before hospitals are approved for residency training in the other specialties. It has been argued, in certain circles, that the Board would be unable to control the standards of such medical departments. This argument is no more valid here than if it were applied in the case of hospitals. Actually, there is evidence for him who seeks it, that a sizeable segment of industry is deeply interested in the caliber of its future doctors, and will cooperate to provide wholly adequate in-plant training facilities.

Symposia

THERE are many problems, common to a number of industries, concerning which investigations are being carried out systematically, from time to time. Scattered throughout the nation are men in a position to corral the best informed minds in these fields of investigation for the purpose of presenting detailed symposia on all the aspects of a given problem as it applies to industrial medicine. To such symposia should be invited all of the doctors known to be confronted in their industrial practice with any aspect of a problem under discussion. Such sessions need be only a day or two, or at most a week or two in length. The response in the form of attendance upon such symposia would in all probability be overwhelming. For this and the refresher type of program small tuition fees could be charged to cover their cost. They might be initiated either in medical centers or by the medical directors of large industries with special knowledge of the subjects under discussion. Both should be publicized beforehand, and so far as possible, with due regard to appropriate editorial critique, their contributions should be disseminated through the channels of organized medicine.

Eventually more adequate training in problems of industrial health and environmental control will have to be provided for both engineers and nurses as well as for doctors. There is room for doubt that the medical profession, itself, is well enough informed at the moment to make any valid suggestions concerning such programs.

If the medical profession is to meet the challenge presented by modern industry to provide adequate health service for all who are gainfully employed, it must put forth every effort to develop all of the educational procedures outlined above. Without them there is little hope of any early development of the requisite high quality of industrial medical practice.

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Workmen's Compensation

FOR some time, one of the functions of the Council on Industrial Health has been the study of the complicated ramifications of medical relations in workmen's compensation. During the past few years, it has been evident that such problems needed the consideration of those whose experience might be of additional help to the Council's Committee on Workmen's Compensation. Accordingly, DR. C. O. SAPPINGTON, Chicago, has been appointed as executive director of this Committee. Consultants are also being appointed representing the administrative, legal, insurance and technical aspects of workmen's compensation. The directors of the Bureau of Legal Medicine and Legislation and the Bureau of Medical Economic Research have been invited to serve as members of this consulting group. Projected activities will include field visits to industrial commissions and insurance organizations, attendance at appropriate meetings, preparation of educational material for publication and distribution, consultation services to state and other medical groups, collection of data for special presentation to the profession and the necessary steps to improve treatment of compensable disability, evaluation of disability and medical testimony. The work of the committee is necessarily long range. A few projects may be developed rapidly; others will take time. Medical activity in workmen's compensation can be improved in many ways, and this new approach should produce definite and measurable results.

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The Treatment of Burns
—With Particular Reference To Local Care—

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BURNS are essentially open wounds characterized by tissue destruction of varying depth over an area of varying extent, which open up tissues to invasion by bacteria for which the exudate and necrotic tissue furnish excellent cultural conditions. Like other open wounds burns vary in severity, and as the severity increases there appear other phenomena which go under the name of burn shock. In both burns and mechanical injuries shock is characterized by loss of blood volume, either from hemorrhage or from loss of plasma-like fluid. These two factors, break in protective surface and loss of blood volume, determine the indications for primary treatment and upon proper observation of them depends the fate of the patient. In the small burn just as in the small wound the local management of the open injury is the main concern of the surgeon since the patient is not likely to suffer general symptoms or shock. As the severity increases however, shock, either latent or developed, is present when the patient is first seen and must receive priority attention.

In the severe case both the local therapy and the general management of the impending or developed shock are important and complement each other. To fulfill one indication at the expense of the other may lead to serious consequences. To treat the shock and neglect adequate local therapy may bring a seriously burned patient successfully through the stage of burn shock only to end up with a badly infected surface and added tissue destruction which may prolong the course or prove fatal. On the other hand, to spend a long time cleansing and dressing a burn to the neglect of replacement therapy may precipitate a severe shock from which the patient is rescued with difficulty if at all. In the severely burned patient both therapeutic attacks must go on simultaneously if the best results are to be obtained.

When the patient has been brought successfully through the first phase of the treatment there are again two therapeutic indications: the local management of the burn and the treatment of the general condition. Here also the treatments go hand in hand, each complementing the other. Adequate restoration of the protein, vitamin, hemoglobin and electrolyte levels makes for more rapid healing, and better "takes" of skin grafts. Likewise, early removal of burn slough, control of the local infection and covering over of raw surfaces with skin as soon as possible help to control fluid, protein and vitamin loss. Both the local care and the general supportive management must be considered as parts of one over-all plan of treatment if acceptable results are to be achieved. The healing of granulating areas even with skin grafts and the best of local care is unconscionably prolonged if the anemia and hypoproteinemia are allowed to persist, while on the other hand the correction of these general nutritional deficiencies is well-nigh impossible if large granulating areas are permitted to remain uncovered for weeks and months.

WE MAY divide the treatment of burns into two phases—the early management and the late management. These two phases are again complementary in that upon the proper carrying out of the initial therapy depends the success of the second phase of treatment. Each step in the treatment has influence upon the succeeding steps in treatment. The surgeon must envisage not just the burn nor just the patient, but the patient with the burn, and not the patient just as he is when admitted for treatment but as a continuous process or development today, tomorrow, next week and until the burn has healed and the patient is restored to health. It is only by projecting the patient with the burn into the future that a proper perspective of his care can be obtained.

The initial local treatment of the burn is based on the concept that it is an open wound associated with a varying amount of tissue damage and destruction. Since it is impossible to judge the exact extent and depth of a burn when it is first seen the initial treatment must be adequate regardless of the apparent severity of the burn. The indications for treatment are to convert this open wound into as clean a wound as possible, to protect it from bacterial contaminants and to promote its rapid healing. When first seen the burn may or may not have been seriously contaminated, depending upon the first aid treatment. The burned area immediately after injury probably contains few virulent bacteria. I cannot believe that the burn itself has any sterilizing effect on the skin—surgical sterilization is too elaborate a process. However, if the wound was covered at once with a sterile or clean dressing the amount of secondary contamination should be minimal since we know that serious wound contaminants usually come from external sources —the nose and throat and hands of persons who inspect the burned surface. The fresh burn can be converted into a surgically clean surface by careful gentle washing with soap and water and irrigating with saline solution, and by the removal of charred skin and blisters. Of course this cleansing must be done under aseptic condi-

From the Department of Surgery, Northwestern University Medical School and Passavant Memorial Hospital. Read before the Sixtieth Anniversary Meeting of the AMERICAN ASSOCIATION OF RAILWAY SURGEONS, November 22, 1948, Chicago.

tions, with operating room facilities and with surgeon, assistant, nurses and patient masked. Cap and gown and rubber gloves are indicated just as for any surgical procedure.

Where very large areas are involved several people can do the washing which should be done as rapidly and gently as possible so as not to prolong the process or to precipitate or increase shock.

The wound cleansed, it should be covered with a simple protective dressing. This dressing should prevent contamination, should exert firm resilient pressure, should not harm the tissues and should be easily removable if the occasion arises. Numerous medicinal applications have been advised and new ones are being tried out continually. The only added indication which these medicaments meet is that of controlling bacterial contaminants. The incorporation of sulfonamides has not been accepted since this drug may be rapidly absorbed from the surface and may lead to serious complications in the patient whose renal output may be already compromised. Zinc peroxide, penicillin, marfinil and numerous other drugs have been advised, but I am not under the impression that the results have been improved. Certainly if some substance can be found which will control local infection and favor healing it should be used, although I am sure it would not alter the basic requirements of the initial dressing.

The cleansed burn surface is covered first with a layer of fine meshed gauze saturated in petrolatum or some other bland substance. This is simply to render it more easily removed and I am sure that plain fine meshed gauze would be just as effective, possibly better. Over this layer are placed a number of thicknesses of flat gauze moistened with normal saline solution and over this large amounts of fluffed gauze or mechanics waste, covered then with abdominal pads and bandaged on snuggly with an elastic bandage or stockinette. The requirements of the dressing are that it be voluminous, snug and firm and evenly applied without constriction. It should cover an area well exceeding that of the burn since the edema extends beyond the actual borders of the burn. In case of the extremities the dressings should usually cover the hands and feet even if they are not actually burned. Chest and abdominal burns are also covered with these voluminous dressings. Burns of the face, neck and scalp are amenable to the compression dressings and heal very nicely under them. The whole head may be bandaged leaving only sufficient exposure to permit breathing and eating. On the hands and feet it is important to place gauze between the fingers and toes before covering them. The eyes should be protected with sterile vaseline, and care taken that the lashes do not turn in on the cornea. The extremities should be splinted with the joints in the optimum position. In the case of the hand we have found the universal hand splint an ideal apparatus for immobilization in the position of function.

Anesthesia is not only unnecessary but is definitely contra-indicated for the cleansing and dressing of the burn. If the cleansing is carried out in a warm room free of drafts and is done gently and quickly with soft cotton and a warm solution, very few patients, even very young children, complain of pain. A small dose of morphine or a barbiturate in case of young children is all that is required. Extensive burns may be as painlessly cleansed as small ones. It is a great comfort to be able to perform the cleansing without anesthesia since the burned patient, especially one with an extensive burn, is a very poor risk and an anesthetic may prove fatal.

The initial dressing is usually not changed for 10 to 12 days. The dressings, however, are inspected every day and if they become loose they are snugged up with another bandage, often over a few additional abdominal pads. Even if the dressings soak through they are not changed, simply reinforced.

In burns of the face the original dressings may usually be changed at the end of four or five days, by which time second degree areas will be found covered with crusts as will also mixed second and third degree burns. Unless there are granulating areas dressings may be dispensed with at this time and the crusts may be allowed to fall off spontaneously. Sterile mineral oil may be helpful on the dry crusted areas after a few days of open treatment. Third degree areas of the face and scalp are managed, as are similar burns elsewhere, by early skin grafting.

For regions other than the face the initial dressings are not changed for 10 to 12 days unless some complication arises such as persistent high fever indicative of infection. By the tenth or twelfth day second degree burns will be found to be healed and covered with loosely adherent crusts. Mixed second and third degree burns and third degree burns will be found covered with a slough which varies in thickness, depending upon the depth of the burn. Some of this slough may be removed at the initial dressing, the remainder should be removed by one means or another during the next eight to 10 days so that the surface may be ready for grafting not later than the end of the third week.

Removal of the slough may be accomplished in one of several ways. In many instances the burn is dressed daily or every other day under strict asepsis, as much slough as possible is removed with knife or scissors at each dressing, and the area is covered with a compression dressing, the first few layers of which are moistened with Dakin's solution. Under this regime all but very deep sloughs separate or are removed in a week or 10 days and a clean granulating area results. As soon as this is obtained it is covered with a split graft. It is not necessary to wait until all areas are ready for grafting, but as suitable sites are made ready they may be covered.

It may not be possible to cover large granulating areas with skin at one operation, either because of lack of sufficiently large donor areas or because of the magnitude of the procedure in a depleted patient. However, if grafts are taken with care successive batches may be removed from the same site at three to four week intervals and very large replacements may be accomplished.

We have tried pyruvic acid to hasten the separation of the slough but have discontinued its use because it is quite painful when first applied and the time gained does not seem to warrant its use in preference to compression and Dakin's solution.

Very deep sloughs which are slow to separate may be removed by actual excision under anesthesia on the seventh to tenth day. Two to five days later the areas are ready for grafting. Split skin grafts take very readily on these surfaces so that by the end of the third or fourth week the burn is completely healed.

The excision, done as early as the seventh to the tenth day, seldom earlier, is not to be confused with the immediate excision which has been suggested as primary treatment. While primary excision would be an excellent procedure in small burns it is not applicable to severe burns. One difficulty in the immediate excision is that one cannot tell at first just how wide and deep the burn is and the excision is likely to be too extensive or not extensive enough. Excision must be done under an anesthetic and except for small burns in which shock is not a factor an anesthetic is a real risk in itself. If we add to the anesthetic risk the extensive operation called for and the blood loss associated both with the removal of the burn and of the skin graft, in a patient already in impending or actual shock, one would anticipate serious even fatal complications.

Tetanus antitoxin, or toxoid in the immunized individual, is always administered. Antibiotics, particularly penicillin, may be given parenterally in large doses (50,000 units each three hours or 300,000 units twice daily) intramuscularly from the start in the case of the very severe burns. Penicillin may be kept up for a period of two to three weeks or until the temperature remains at normal for several days. It is difficult to assess the real value of penicillin therapy. It is probably more valuable in early care than later when rapid covering of granulating areas is the most important factor in the control of the burn "infection."

THE general management of the burn patient is as important as the local care. Minor burns of 5% or less of body surface, and in some instances burns up to 10 or 15%, may require no general therapy. It must be remembered however that young children and old people withstand burns poorly and may go into shock with burns of 10% of the body surface. In small burns shock is not encountered and all that is required is the local care of the wound. However, in burns of any extent and certainly in the seriously burned patient the treatment of latent or developed shock takes top priority. Treatment must be started as soon as the patient arrives in the hospital, before the cleansing is started, so that while the local treatment is going on fluid replacement is running into the veins.

Whatever the final conclusion will be regarding the presence of a burn toxin to account for certain of the general manifestations of burns there is general agreement that the most important factor in burn shock is diminished blood volume due to loss of plasma-like fluid. These fluids are first lost interstitially, but within a very few hours a protein-rich fluid pours in large amounts from the burn surface. There is agreement also on the fact that at first the loss occurs into and from the burned area and into the tissues immediately about it, and that only later when the results of diminished blood volume and reduced venous return and of tissue anoxia become severe may the fluid loss become more generalized. Two significant conclusions follow from the local nature of the fluid loss into the burn area. One is that the extent of the burn is of paramount significance: the larger the burn the greater the fluid loss, the greater the likelihood of shock, and if shock occurs the more severe it will be. The other conclusion upon which the immediate therapy is based is that the blood volume should be restored to normal as rapidly as possible and kept at normal as long as the tendency exists for fluids to leak out of the capillaries. Why the fluids leak out of the capillaries in the first place we do not know. We only know that it occurs, that the tendency lasts about 48 hours, is a continuous process requiring constant replacement to keep up with it, and that if it is not checked it will prove fatal. True enough, there is vascular constriction and the body draws upon its interstitial fluid stores to help maintain blood volume, and in burns of not too great extent this physiologic compensation may be sufficient to carry the patient through the critical stage. In severe burns, however, the physiologic compensation is not enough and if not checked will lead to serious complications of its own.

Control of blood volume depends upon the administration of fluids in amounts equalling those lost in the tissues, plus amounts necessary to supply the ordinary fluid requirements. Some idea of the magnitude of fluid losses may be gained from experiments on shock which have shown that in burns of 15 to 20% of body surface there may be 70% loss of blood volume. The amount of fluid required at any one moment to restore blood volume to normal depends upon the blood volume at that particular moment. But we have no easy or rapid method of determining the blood volume. Our best guides at present are the hemoglobin values, the red cell count and the hematocrit value or cell pack. They are at best only fairly accurate indices of requirements. While we know the normal average values of

red cell counts, hemoglobin amounts and cell pack, we do not know the pre-injury values of the individual patient under consideration. A patient with a low red cell count before injury may have a normal count on admission, which in his case may indicate marked concentration and loss of blood volume. If hematocrit and hemoglobin determinations are made immediately upon admission of the patient we have a base line from which further changes can be judged. The tests should be repeated every two to three hours during the first 48 hours and the treatment governed by the results. Rising values indicate the need for continuous fluid administration: as the values recede the amounts of fluids may be diminished. While one can get some idea of the amount of fluid needed by measuring the size of the burn and from the early hemotocrit values, these are only relative since the loss is continuous and the only safe way is to keep continuous watch of the patient, observe symptoms and make frequent laboratory determinations. Thirst is a good guide as to the general condition of the patient. A thirsty patient is a dehydrated patient despite all the laboratory tests. Various formulae have been devised for the calculation of the fluids required to restore the volume to normal, but they are simply good initial indications of the possible magnitude of fluid requirements. Thus there have been suggested such amounts as 50 cc. of plasma for each percentage of body surface burned, or for each percentage of hemoglobin rise over 100%; or 100 cc. of plasma for each 1% rise in the hematocrit over 45%. The values are ordinarily too low and it is only by constant watching and checking that shock can be prevented or overcome.

DURING the early stage of burn shock the emergency need of the patient is for rapid increase in the blood volume, accomplished by a fluid containing molecules which will not pass too readily through the capillary walls. For this reason electrolyte solutions, while they will momentarily increase the blood volume, are soon lost. Plasma which is the essential fluid lost would appear to be the material best suited to replace the blood volume, and has been so accepted quite generally. While it was thought for a long time that whole blood was contra-indicated in burn shock, for fear that the addition of corpuscles would increase the cell pack, the opinion held by many today is that whole blood may be even better than plasma. The increase in numbers of red blood cells is more apparent than real since there is usually a drop in the absolute number of red blood cells, many of which are destroyed by the burn, while others are trapped in and about the area of the burn. The burn anemia has its start during the period of burn shock. Not only will whole blood help to restore blood volume but it gives the patient a good start toward correcting the severe anemia and hypoproteinemia which characterize the extensive burn and for which repeated transfusions are given in the later phases of treatment. Whole blood also supplies twice the amount of protein, volume for volume, that plasma supplies since the protein of the red cells is of highly significant value.

It is our practice to give both plasma and whole blood at the start of burn shock therapy, administering 500 to 1000 cc. of whole blood each 24 hours and making up the remainder of the requirements with plasma. Plasma has the advantage of being readily available and since it does not require typing may be started at once. There is no reason why with trained personnel it could not be started on the scene of the accident so that it could be running when the patient arrives in the hospital, in much the same way as was practiced in the last war. Certainly as soon as the patient with a burn is admitted to the hospital plasma should be started in one or two veins so as to be running at the time the primary cleansing is done. With very severe burns it may be advisable to wait an hour or more before starting the local therapy which should then be done as rapidly and gently as possible.

The patient will require other fluids during the period of burn shock. There are the ordinary daily requirements of some 2500 cc. of water for daily fluid turnover. Added to this is replacement of fluid lost from the tissues in the compensatory mechanism of physiologic restoration of blood volume. Besides the fluid the patient requires electrolytes, particularly sodium, which is poured into the edematous areas and thus momentarily lost to the body economy. Usually a sufficient amount of water and electrolyte can be given orally as saline solution diluted with water. One hundred to 200 cc. of diluted saline can be given each hour as long as the patient complains of thirst. Usually one liter of normal saline in 24 hours is enough to maintain electrolyte balance; the rest of the fluid may be water. The administration of sodium bicarbonate (10-15 grams a day) or of sodium lactate along with the oral fluids seems to replace electrolyte trapped in the burn edema. After 72 hours the patient will be on a diet which will supply the required amounts of salts, and at this time the edema is receding and the salt is being returned and excreted, and may then be in excess.

The amount of fluids necessary can be determined by the thirst of the patient and the urinary output. Twelve hundred to 1500 cc. of urine should be excreted per day, and the surgeon should strive to give fluids to keep it at this level.

When the burn shock has been brought under control the surgeon must start at once to correct the hypoproteinemia and anemia which will require attention as long as the areas remain open. When the blood volume has been restored the surgeon will find that the proteins which may have appeared high during the phase of shock are badly depleted and the increased red cell count and hemoglobin values will be replaced

by an anemia. The primary loss is not however the final loss but there is continuous red blood cell and protein loss until healing is completed. Burn anemia has its start at the time of the injury in that cells are destroyed by heat, and trapped in the burn area. The initial loss may be very high, equivalent to a massive hemorrhage.

Infection of the burn surface, loss from granulating areas and an actual depression of hematopoiesis may entail losses of 75 cc. to 200 or 300 cc. of packed red cells a day.

To correct and counteract this situation the patient will require a 4000 to 5000 calory diet high in proteins and vitamins to bring the values up to normal. Here too one cannot predict at the start the final requirements. Frequent blood checks must be made and the patient's weight and general appearance taken into consideration. Protein in the amounts of 150 to as high as 300 grams a day may be necessary over a period of several weeks or even months. Frequent blood transfusions will be required. It must not be forgotten that the vitamin requirements are very high in burn patients and that 500 to 2000 milligrams of vitamin C, 25 to 50 milligrams of thiamine and correspondingly large amounts of the other B components may be needed to keep up proper levels. These nutritional losses exist as long as the burn remains unhealed and probably in some ratio to the surface area involved. Very large amounts of protein and large numbers of red cells may be lost from granulating areas. The rapid covering of these surfaces with skin promotes more rapid nutritional restoration just as more rapid nutritional restoration promotes the healing.

THE third or cicatricial stage of the burn can scarcely be discussed here except to point out that the difficulty of correction of scar deformities can be minimized by good early care. If second degree burns are kept clean they will heal with minimal scarring. If, however, infection develops they may be converted into third degree burns by infectious necrosis. Granulating areas of third degree burns allowed to persist for a long time without benefit of skin graft pile up more and more granulations which produce heavier and heavier scar. Skin grafts even if initially successful on old granulating surfaces often break down and require extensive excision before their surfaces can be satisfactorily covered. Many deep burn areas if grafted early with split skin grafts may be perfectly satisfactory and require no further plastic repair. If plastic correction subsequently becomes necessary the surgeon has much less difficulty in the operation, the scar is thin, more easily excised, and the deformities are less.

The Scope of Medical Services

FROM a functional point of view medicine is indivisible. In recent years there has been a growing recognition of the interdependence, if not unity, of preventive and therapeutic medicine. What is therapeutic for one person at a certain time, is often preventive for another person, or for the same person at a different time. Furthermore, the most successful therapy is that which is initiated as early as possible in the course of a disease. As a result, it is becoming more and more difficult to distinguish between prevention and therapy. The application of this fact to industrial hygiene is obvious: there is no valid functional separation between preventive and therapeutic medical services for workers. Equally invalid is the functional separation of medical care for occupational and non-occupational illness. What was considered non-occupational in origin yesterday is today proved to be caused by occupation. As the good health of the worker, not the source of his illness, is the financially important factor, the monetary approach is equally valid for non-occupational illness. In fact, in terms of absenteeism rates, the economic loss due to non-occupational illness must be considerable. Most recent studies indicate that about 90% of absenteeism is non-occupational in origin, or least so classified. In spite of this, management has not been convinced that the savings gained by providing workers complete medical care would equal or exceed the cost of such a program. However, the companies that do provide complete medical care for their workers are thoroughly convinced of its financial worth. On the basis of their experience they feel there is no question that such service at least pays for itself as well as produces important intangible benefits. In evaluating the comprehensive medical care program at the Consolidated Edison Co. of New York, DR. J. J. WITTMER concluded that "as a result, our absenteeism rate is well below the national average. Our worker efficiency is at a high level and employee morale is all that one could hope for."

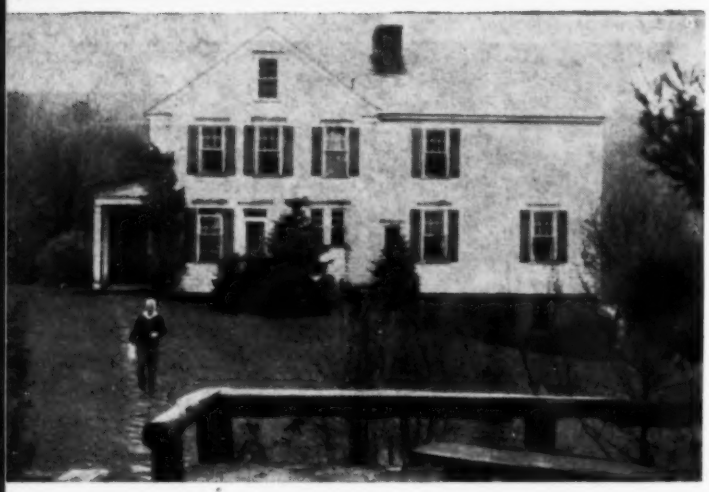
—From "The Industrial Hygienist and Medical Care," presented by WALTER J. LEAR, M.D., before the Industrial Hygiene Section, A.P.H.A., Boston, November 11, 1948; published in *Industrial Hygiene Newsletter*, January, 1949.

Drs. Belknap and Sander
"Servants" for 1948

Dr. Selby, giving the
Ramazzini Oration

Drs. Leggo and Sterner

On



Above: Main Lodge. Below: One of the Cottages

The Third Ramazzini Rendezvous
—November 18-21, 1948—

THE annual RAMAZZINI Rendezvous was held November 18-21, 1948 at Seven Springs Farm, approximately 80 miles from Pittsburgh, in the Laurel Mountains, which represent the western foothills of the Alleghenies.

Here on an 8,700-acre preserve, presided over by Adolph and Helen Dupre, there were many activities both inside and outside which attracted the Ramazzini group. Among these were visiting the many buildings on the preserve, including a ski lodge, the maple syrup production, lumbering, and the various farm enterprises, as well as the fish hatchery, the shooting range, and the provisions for hunting activities.

In addition to the 1948 "servants" BELKNAP and SANDER, there were in attendance RAMAZZIANS CUNNINGHAM, JOHNSTONE, KEHOE, LANZA, LEGGO, McCONNELL, McCORD, MEEK, PETERSON, SAPPINGTON, SELBY and STERNER, with DR. HARLEY KRIEGER, DR. WILLIAM P. YANT, DR. E. A. IRVIN, and MR. JOHN McMAHON, as guests.

While the inclement weather at the beginning of the rendezvous might have cut short some of the exploration parties over the large preserve, the indoor activities, as some of the photographs will show, were very popular for most of the group.

The only scheduled presentation, the annual oration, was read this year, by DR. CLARENCE D. SELBY, of Detroit, on the "Life and Activities

Talking It Over: Selby, Johnstone, McConnell. At the Table, Left to Right:
Peterson, Krieger, Yant, Kehoe, Sander, Lanza, McCord, Irvin

On the Shooting Range. Left to Right: Johnstone, Kehoe, Lanza, Yant, Peterson, Belknap

In the Lounge. Left to Right: Cunningham, Meek, Irvin, Johnstone, Peterson

of Dr. Charles Turner Thackrah." This oration was given as usual on the Friday night of the Rendezvous.

The RAMAZZINI SOCIETY is an honor group of physicians who devote their entire time to industrial medicine, occupational diseases, and similar activities. It was founded in 1942. This was the Third Rendezvous, the other two having been held at St. Clair, Michigan, in 1946, and at Saranac Inn in 1947.

One of the earliest established principles of the RAMAZZINI SOCIETY was that there should be no officers, but that each year one or more "servants" were to be appointed to carry on the necessary correspondence and other matters to keep alive the spirit of the patron saint Ramazzini among the members of the society. The "servants" for 1946 were DRS. SELBY and MCCORD; for 1947, PETERSON and SAPPINGTON; for 1948, BELKNAP and SANDER, and for 1949 they are CUNNINGHAM and RIDDELL.

Meanwhile the society has developed its objectives and principles. As stated by some of the early members, there is no place for personal ambitions, for there are no officers or offices, no scientific programs, no by-laws as such, no dues, and, therefore, no funds to be disbursed. In fact, one of the tenets of the society is to abolish the "ten-pound look, hair curlers, and pompous stuffed-shirtism."

It is realized that there are many others over the land, non-members, who are qualified by attainments and devotion, some of whom may later become members.

Above: Kehoe, McConnell, Sappington, McCord, Krieger
Below: McCord

Front to Back: Left: Yant, Sappington, Leggo, McCord. Right: Peterson, Meek, Irvin, Krieger, Cunningham, Sander

Front to Back: Left: Johnstone, Lanza, Irvin, Krieger. Right: Kehoe, Selby, McConnell, McCord, Leggo

Charles Turner Thackrah

E. A. IRVIN, M.D.,
Medical Director, Cadillac Motor Car Division,
General Motors Corporation,
Detroit, Michigan

MAN, in his several relations, is assuredly the most interesting subject for examination and reflection. His external form, his internal structure, the number and complexity of organs, their harmony and mutual support, the surprising power which restores injured parts, the organs which, connecting man with his fellows and the world, are the agents of social relation, these exhibit the first animal in the universe—the work of a Creator all-wise and benevolent.

"Though we cannot rival the agency of superior wisdom; though we can neither make man, nor improve his original organization; we may reduce his character, weaken his frame, and bring on him premature decay and death. It is one thing, indeed, to view this being, as God made him; it is another, to examine him in a state of moral and physical degradation."

CHARLES TURNER THACKRAH

This expresses the philosophy of a great man —CHARLES TURNER THACKRAH. It shows his love for, and knowledge of MAN; his keen sense of the greatness of man, and yet he was aware of man's potential weaknesses; his complexities and simplicities; his great strength; and he also acknowledges the great work of the Creator—the Supreme Being.

The Life of Charles Turner Thackrah

CHARLES TURNER THACKRAH was born in 1795. There is very little recorded of his early life. When 16 years old, he became an apprentice to a surgeon in Leeds and studied very diligently in his spare time on medicine, history, and subjects of general knowledge. In 1814, he became a pupil at the Leeds Infirmary, and during the next two years, at Guy's Hospital, was under the influence of Sir Astley Cooper. This training under Sir Astley had a very definite effect on THACKRAH'S life.

In his diary, he says that his hours of study during this time at Guy's Hospital were usually from 7:00 A.M. to 11:30 P.M. In 1817, he went into practice on his own. Even at this time, his general health was impaired by debility, a result of a chronic intestinal infection which never entirely left him. This chronic illness early in life made his outlook on life unusually sombre.

He wrote, "On a temperament like mine, naturally melancholic, with feelings naturally keen —at times, alas! painfully acute—the common trials and disappointments of life produced an effect which is unknown to a man of less sensibility."

In the year 1818, one year after going into private practice, he was appointed the town's surgeon, and in 1819, at the request of the committee of the Leeds Work House, he drew up a report on the miserable state of the inferior lodging houses.

His leaning toward preventive medicine and the health of the general public may have been influenced by Robert Owen.

In 1814, when THACKRAH was only 19 years old, he met Robert Owen when Owen made a survey of the New Lanark Mills, and Owen's strong personality undoubtedly had a definite effect on THACKRAH'S life.

In 1824, he became greatly interested in the health of the working people and commenced his inquiries into the effects on the health of the working people of the various manufacturing processes and the environments of the individuals while at work.

In 1831, he joined others in establishing the Leeds School of Medicine, and worked very

[NOTE: This, the Annual Ramazzini Oration, by DR. IRVIN, was read by DR. C. D. SELBY, at the Rendezvous of the RAMAZZINI SOCIETY, at Seven Springs Farm, in the Laurel Mountains of Pennsylvania, Friday, November 19, 1948. The portrait is copyrighted by the University of Leeds.—ED.]

enthusiastically and actively to make this school a success. It was at this time that he published his book which was well received by both the profession and the general public.

He visited New Castle and Gateshead during a cholera epidemic and subsequently until his death in 1833—at the age of only 37—he gave every spare moment to a new edition of his work on the blood. He seemed to realize how short his life would be and was determined to make it crowded. In Whitehead's sketch of THACKRAH'S life, he illustrates THACKRAH'S views and feelings from one of his unpublished lectures as follows:

"Is the fervour of youth to be wholly expended in the accumulation of wealth? Are there no noble objects for your ambition? Why should you not be Harveys, Hallers, and Hunters? Why not emulate the examples of Hewson, Dessault, and Bichat? Soaring above their professional associates, deriding the attacks of envy, unbroken by anxiety, and toil, they held on their course of glory. They all died at an early age, but their youthful studies brought an honour which the mature efforts of their envious competitors could never obtain. Their names are engraven in the temple of fame."

In 1831, THACKRAH published a book entitled: "The Effects of the Principal Arts, Trades, and Professions, and of Civic States and Habits of Living, on Health and Longevity: with a particular reference to the trades and Manufacturers of Leeds; and Suggestions for the Removal of many of the Agents which produce Disease, and shorten the Duration of Life." It was published first in London and later in Philadelphia.

He was prompted to write his treatise because of his love for his fellow men. He intended the paper for the use of the public, especially of that part of it comprised in the class of laborers and mechanics and, therefore, attempted to present it in a plain, simple style. He had a keen understanding of the value of good human relations.

The economic and working conditions were such that he felt compelled to play his important role in the Industrial Revolution in England. Prior to this Revolution, England had been at war—the continent was involved in the Napoleonic Wars from 1793 to 1815.

Wars fostered the growth of the British manufacturers. It is shameful but true that war creates wealth. In this instance, the continent set-back made Britain supreme. War was a disaster to the economic life of Europe. British commerce pioneered the way for the expansion of British industry. The great inventions in the past were the result of the "active will" to seize commercial chances. At the turn of the century, England's importing was the highest in its history. England was "King of the Sea," with large imports from the Far East, American Colonies, India, etc. Trade brought new industries—foreign to a land whose main occupation was farming. The resulting competition for the people in England stimulated industrial initiative.

Prior to this sudden rise in industry and commerce, most of the work had been done in the home, in the rural districts, or in small shops. Most work on wearing apparel, cloth, pottery, and leather goods was done at home. The decay of the domestic system of industry deprived the rural population of a means of livelihood and caused a shifting of the population to the industrial centers in the cities. The cities suddenly became over-crowded and living conditions were extremely bad. Most of the workers lived clustered around the factory—in its very shadow, so to speak. They frequently lived in low class lodging houses and rented their beds in work shifts and the beds were never cold. In many sections, the streets were narrow, the houses poorly built, often with practically no windows and often the windows were not made to open. Many lived in cellars which were damp. There arose the tremendous problems of sanitation, sewage disposal and water supply.

The working conditions in the factories were no better than the living quarters and frequently worse. The ceilings were low to economize space, and the windows were usually narrow and few. In the cotton mills, fluff filled the air. In the flax spinning mills, it was necessary to have the air saturated with moisture and the workers' clothes were usually dripping wet.

In spite of these atrocious conditions, it was not unusual for the workers to toil for 14 to 16 hours each day, with only a 30- to 40-minute lunch period once during this time. In most factory centers, there was a marked shortage of workers and this gave rise to the importation of paupers. It was not unusual for a parish to send workers to an employer with the stipulation that they had to take one idiot with every 20 paupers.

In the textile trades, manufacturers found another way out of their labor trouble by resorting to women and children. Spinning was quickly learned and little strength was needed to actually carry out the procedure. In certain processes, small children and delicacy of touch made best aids to the machines. Women and children were preferred because their weakness made them docile and they could be reduced to a state of passive obedience. To many, the factories were a symbol of hell—the children were frequently beaten with fists and riding whips and it was not unusual for them to be strapped or shackled to their machines. Many of these children were deprived of adequate diets and the resulting diseases and deformities of their bodies were not unusual, to say nothing of the lack of education in this group. Diseases were very common in this laboring class, with a relatively high death rate. In 1830, the cholera epidemic shook the nation and 50% infected with the disease died. Many other epidemics occurred and because of the crowded conditions, they took their heaviest toll in the industrial centers.

In addition to the common diseases of the day, the crowded conditions led to immorality and the vice or disease of alcoholism.

From these conditions, it is easy to see what

gave THACKRAH the impetus to write his book. As he expressed it, "The object of this paper is to excite the public attention to the subject."

He expressed his appreciation of the wonders of science and art; the buildings and factories; the changing of raw materials to finished products, such as wool to clothing, etc. He marvelled at the drawing of minerals from the bowels of the earth and converting into power which surpassed the combined power of the greatest animals. As he so aptly expressed it: "These works are wonderful, but while we admire—let us examine. What are the effects—the physical—the moral? To say nothing of the wealth produced—for wealth is good or evil according to its application."

THACKRAH became interested in the health of the 50,000 persons spending their lives in the factories and occupations of Leeds. The great question: was life expectancy as great in Leeds as in the adjacent agricultural districts? He was astounded at the attitude of indifference in regard to this question. "The destruction of 450 persons a year in Leeds cannot be considered by any benevolent mind as an insignificant affair."

He investigated and inspected various trades, occupations and industries and developed tables illustrating the character of disorders prevalent in the several kinds of employment; admitting that his studies might be imperfect but he was sincere in his approach to the truth.

He recognized that the subject was new; that the industries of Leeds had never before been examined in regard to their important relation to health and longevity. He, therefore, had no guide or previous work to follow for assistance.

THACKRAH was aware of the fact that health is to most persons a disagreeable subject of inquiry, whether it relates to the individuals themselves, or the community. It is a human failing to be reluctant to admit that our community or neighborhood may have a greater mortality than other parts of the country; therefore, we avoid the annoyance of an investigation, or try to show the findings to be erroneous. THACKRAH asked, "Is this wise—is this manly?" "Is it the part of reason to shrink from inquiry?" and further stated: "Most persons, who reflect on the subject, will be inclined to admit that our employments are in a considerable degree injurious to health; but they believe, or profess to believe, that the evils cannot be counteracted, and urge that an investigation of such evil can produce only pain and discontent. From a reference to fact and observation I reply, that in many of our occupations, the injurious agents might be immediately removed or diminished. Evils are suffered to exist, even where the means of correction are known and easily applied. Thoughtlessness or apathy is the only obstacle to success. But even where no adequate remedy immediately presents itself, observation and discussion will rarely fail to find one. We might even say, that the human mind cannot be fairly and perseveringly applied to a subject of this kind, without decided effect."

THE following is taken from the *Lancet*, London, Saturday, July 9, 1831:

"We hail the appearance of this interesting little volume with feelings of much satisfaction, as well for the intrinsic value it possesses as because it seems to be the precursor of some public excitement on the important topic to which it relates. The necessity of such excitement is great beyond belief. In this country alone, of all the nations which claim the epithet of civilized, is the conservation of the public health abandoned by the legislature to the caprice and neglect of the community itself. In France, the code of health devised by Napoleon was found so valuable in its action, and to exercise so complete a preservation influence, that his stupid and fanatical successors, while they defaced multitudes of the monuments of that great man's glory, upheld this in its full force, and even made additions to its utility. In Germany, the same solicitude prevailed; and even the savages of the Dnieper and the Don are protected by the imperial ukases from the operation of the insidious causes by which national constitutions (taken in the strictly physical acceptation of the term) are liable to be undermined and destroyed. In England alone is it that the principles of popular liberty are so sagely maintained that the people are allowed to poison themselves with adulterated food and medicines, or to be suffocated in the asphyxiating vapours of manufactories, without the slightest concern being manifested by the rulers of the land.

"From the annexed quotations and remarks, some notion may be formed of the enormous losses this nation has already sustained, by the reckless and insensate neglect by her constituted authorities, of the choicest treasure a country can possess, namely, a numerous and athletic population. How deeply, in the sequel, this neglect will debase us in the scale of nations, how effectually it will incapacitate us from commanding the respect of foreign powers, it is a matter of painful facility to perceive.

"MR. THACKRAH'S volume is principally founded as its title imports, on the observations made by the author and his pupils on the state of health of the manufacturers in the town of Leeds and its vicinity. The work commences by some apt remarks, in which he points out the destructive influence which many trades and manufacturers exert on the health of the unhappy and unprotected workmen; and by comparing the bills of mortality in the rural and manufacturing districts, he establishes beyond the possibility of denial, as his first general position, that the balance of disease and death is frightfully against the unfortunate artizan."

The reviewers of this book then point out that MR. THACKRAH states: "This information in regard to the high mortality rate in the manufacturing districts is not novel. That these facts have long since been a matter of notoriety but it is useless to discuss the extent of evil, the existence of which is necessary and its nature

irremedial; and that the incurability of this case can be denied." They then review one typical subject which THACKRAH had discussed in his book; the state of health of the Leeds flax workers. They further state in the article that they do not agree completely with THACKRAH'S suggestions for a mechanical plan for the removal of pernicious dust, however, they state that THACKRAH'S plan has some merit but is not as good as the modification devised by M. Parent du Chatelet. Further quoting the reviewer—"In conclusion, we confidently recommend MR. THACKRAH'S work to the attention of the profession, among which we trust he will find some successful followers in the benevolent course he thus invites others to pursue."

IT IS INTERESTING to compare the work of Ramazzini, "Diseases of Tradesmen," which was written 130 years before THACKRAH, toward the end of the 17th century. It is true that Ramazzini dealt with about the same groups of trades people, however, Ramazzini stuffed his book with all he could, and Ramazzini could not distinguish between an offensive and a dangerous trade. THACKRAH on the other hand, was a thorough anatomist, and an excellent clinician who approached his subjects with a true thoroughness. The clinical training which he had under Cooper is reflected in his later work during the investigation of the effects of working environment on the health of the working people. He was not led away, like Ramazzini, to thinking that offensive trades are always injurious to the health of the workman. It is unfortunate that this man died at such an early age, because his untimely death undoubtedly retarded the progress of industrial medicine.

[NOTE: The following, by PROFESSOR RONALD E. LANE, Nuffield Department of Occupational Health, University of Manchester, England, was written to accompany the first published portrait of CHARLES TURNER THACKRAH, photographed from the original which was recently discovered in a vicarage of the Cathedral at Leeds and is now hanging in the Board Room of the University of Leeds School of Medicine. This portrait (page 66) and PROFESSOR LANE'S article are published here by special permission from the University of Leeds School of Medicine and the *University of Leeds Medical Magazine*, secured for us by DR. ROBERT T. LEGGE, of Berkeley, California.]

THE Effects of Arts, Trades and Professions and of Civic States and Habits of Living, on Health and Longevity, with Suggestions for the Removal of many of the Agents which produce Disease and shorten the Duration of Life."

This is the long title Thackrah gave to a short book of some 220 pages. It is the book, however, on which his title to fame justly rests. First published in 1831—two years before his death—it opened a new line of thought in preventive medicine. In the preface to the second edition (1832) he writes "If any object, that the *cure*, not the cause or prevention of disease, is the business of the medical practitioner, I would reply that the scientific treatment of a malady requires a knowledge of its nature, and the nature is but imperfectly understood without a knowledge of the cause."

Thackrah was a great pioneer in preventive medicine. Born in 1795, Thackrah became a pupil at Leeds Infirmary in 1814, after having been apprenticed for two years to a local surgeon. From Leeds he went to Guy's Hospital for two years, where he came under the influence of Sir Astley Cooper. He was a keen anatomist and on his return to Leeds was the first to give "a public course of anatomical lectures in this place, and his exertions ultimately gave origin to the more effective organization of the Leeds Medical School." (Ikin, *Provincial M.J.*, 1851.)

Throughout his life he suffered from ill-health and this may have affected his temperament, which he himself described as "melancholic." Be this as it may, he was undoubtedly an able and energetic man with a strong social sense. There is some evidence that he came under the influence of Robert Owen, one of the greatest pioneers of industrial health and welfare. By 1824 Thackrah had commenced his enquiries into the effects on health of various occupations. The results of these investigations were recorded in the famous book referred to above, which was the first work of its kind to be published in this country, and is referred to by Sir John Simon as being comparable, as a contribution to preventive medicine, with the work of Jenner on smallpox.

Thackrah's book presents an orderly analysis of the environmental factors associated with different types of work, and though his writing is somewhat sententious by modern standards it shows a sound scientific outlook. Most of the work deals with "operatives" and he discusses their work under six heads. Those who work (a) in the open air, (b) in a confined space, (c) in a dusty atmosphere, (d) with agents injurious to the skin, (e) with wet and moisture, (f) in high temperatures. His observations are shrewd and well balanced and his conclusions show a sound judgment and a deep insight.

He was especially concerned with the dusty processes in the flax mills, and speaking of this investigation he says "the coughs of the persons waiting to be examined were so troublesome as continually to interrupt the exploration of the stethoscope." Like so many pioneers of his time he was deeply moved by the conditions under which children worked in factories. He expressed his feelings in these emphatic and lucid words: "The employment of young children in any labour is wrong. The term of physical growth ought not to be a time of physical exertion. Light and varied motions should be the only effort—motions excited by the will not by the task master—the run and leap of a buoyant and unshackled spirit."

Thackrah made numerous recommendations for improvements in factory conditions, in fact it has been authoritatively stated (1932) that "it is difficult to find a page in this book which does not foreshadow future developments in industrial medicine." It is surprising that he was not consulted on the Factory Legislation which was to be introduced in 1933; had he been it is possible that its provisions would have been wider and its application less restricted. Thackrah's crowded life was brought to an untimely end by his death from tuberculosis in 1833 at the age of 37. Legge (T.M., 1920) expresses the view that his early death retarded the progress of industrial medicine, with all it would have meant in the improvement of working conditions for half a century.

The Donora Disaster

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THE recent unfortunate conditions which precipitated the dramatic onset of 20 fatalities and illnesses in the Borough of Donora, Pennsylvania, have focused the attention of numerous groups on the problem of atmospheric pollution. Many inquiries have been received from public agencies soliciting information concerning the cause of the deaths and illnesses in Donora. It is impossible at this time to say, with any degree of certainty, what the specific agent was. However, it is believed that there were several factors which must be considered, and it is the purpose now to review some of the known facts.

The Borough of Donora, with a population of approximately 14,000 persons, is located on a horseshoe bend in the valley of the Monongahela River in Washington County in southwestern Pennsylvania. It is one of many industrial towns in the valley formed by the Monongahela River. On each side of the river at Donora, the steep hills rise approximately 400 feet above the river surface. The main industries in Donora are a zinc smelting plant, a steel and wire plant, and a slag crushing plant. For many miles up and down the river from Donora there are other heavy industries, steel mills, coke plants, and bituminous coal mines. Shipping along the river at this point is reputed to exceed, in tonnage, that of the Panama and Suez Canals combined. These river boats haul coal barges from the mines to the industries located many miles along the river. Also, there is considerable rail freight shipping in the river valley, so that in addition to the atmospheric contamination caused by the industries in the area, there is also further contamination caused by the locomotives and boats.

For a period of four days prior to the onset of the illnesses, fog prevailed over the valley. The fog was unusually heavy and the older residents were in agreement that in their memory they had never experienced such a condition in the area. For several days it was reported it was impossible to see across the street. Air movement was at a virtual standstill.

The first fatality occurred at 1:00 A.M. Saturday, October 30, 1948. Others soon followed, and it was not until late on Saturday that the borough officials and the local Board of Health realized they were in the midst of a disastrous condition.

Upon being apprized of the situation at Donora, the Director of the Pennsylvania Bureau of Industrial Hygiene contacted the Secretary of the Donora Board of Health. It was learned that approximately 500 people were ill with complaints of shortness of breath and cough. Additionally, it was learned that there were 19 deaths in the community from 1:00 A.M. Saturday, October 30, 1948, until about 1:00 P.M. Sunday, the following day. Medical histories of the fatal cases indicated that two of them were known to have had active pulmonary tuberculosis. The other 17 cases were known to have had chronic heart disease or asthma. All fatal cases were in persons between the ages of 52 and 85 years. At the zinc works there were nine cases of illness, with symptoms similar to those described, among the employees treated at the plant during the period cited above. There were no fatalities, however, among these employees.

In the community, numerous interviews were had with borough officials and residents of the area and the vast majority of persons contacted were of the opinion that the chief source of atmospheric contaminants was due to the stack discharges from the zinc works. It was then learned that the management of the smelting plant had decided to curtail production to a minimum so as to prevent the additional accumulation of atmospheric contaminants. Since all testimony of the residents and officials of the area indicated that the smoke and fume discharge from the zinc plant was a major source of atmospheric contamination, it was believed expedient that the plant continue to curtail operations until such time as they were notified by Dr. Norris W. Vaux, Secretary of the Department of Health, that it was safe to resume.

Among the most irritant of the gases emanating from industrial smoke stacks, and from zinc plants in particular, is sulphur dioxide (SO_2). Accordingly samples of the atmosphere were collected in cooperation with the Industrial Hygiene Foundation, located at the Mellon Institute in Pittsburgh, who had been retained by the management of the zinc plant.

A TOTAL of six samples were obtained before and during the lifting of the fog. The first sample was obtained at 8:23 A.M. Sunday, October 31, 1948, and the last sample for sulphur dioxide was collected at 1:20 P.M. that same day, representing a sampling period of approximately five hours. At approximately hourly intervals, including the one collected at 12:21 P.M., it is to be noted that the atmospheric concentrations dropped off at a fairly uniform rate, e.g., from 0.54 parts per million (ppm) to 0.42 ppm to 0.33 ppm to 0.21 ppm at 12:21 P.M. At 12:39 P.M., 18 minutes later, the sample indicated a concentration of 0.15 ppm and at 1:30 P.M.—41 minutes later—the concentration was at 0.08 ppm. Thus, within five hours the concentration dropped from

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0.54 parts of SO_2 per million parts of air to 0.08 parts per million.

Obviously, these data in no way indicate the concentration that may have been obtained late Friday night, October 29, 1948—the time of the onset of the illnesses. Some thought has been given to estimating the concentration of SO_2 that may have existed at the time of the shutdown of the plant. Extrapolating from known data to 6:00 A.M. Sunday, it may have been possible to have had close to one part per million of SO_2. However, this is all highly theoretical and of doubtful certainty for it is actually not possible to say what concentrations of SO_2 really were present.

A sample for the determination of soluble sulfates was also collected on Sunday morning. The sulfates were assumed to be present as sulfuric acid and the concentration encountered at the time of sampling was equal to 0.2 milligrams per cubic meter of air.

Inasmuch as maximum allowable concentrations for the determination of the extent of the health hazard to a community resulting from atmospheric pollution have not been established, it is believed that by examining the concentrations we have encountered and comparing them with the maximum allowed concentrations established for an eight-hour work day, we may be able to obtain information on the relative hazard involved. By this method we believe that the concentrations encountered in comparison with the maximum allowed reveal information which may be of significance. For example, the maximum concentration of sulphur dioxide determined was found in the first sample and was equal to 0.54 parts per million parts of air. This concentration of sulphur dioxide is equal to 5.4% of the maximum allowed. From this it may be inferred that perhaps the soluble sulfates have been more of an etiological agent than was the sulphur dioxide. Only by further study of this problem can these factors be determined.

The Pennsylvania Bureau of Industrial Hygiene is continuing atmospheric sampling in the valley—specifically for SO_2 and soluble sulfates. As of November 10, 1948, 73 atmospheric samples for SO_2 were collected which on analysis indicated concentrations from zero to 0.75 parts per million parts of air. Also, 73 atmospheric samples were collected for the soluble sulfates. Analysis of these indicated concentrations from zero to 0.17 milligrams per cubic meter of air.

THE question may be raised as to what significance can be attached to these concentrations. This can only be answered by comparing them with standards. Fortunately, in this particular instance, in the field of atmospheric pollution, sulphur dioxide has received relatively considerable attention.[3,2] Hemeon and Hatch[1] state: "The maximum safe concentration (for atmospheric pollution) has been determined, and it is now considered good practice to operate plants producing this gas in such manner as to avoid ground-level concentrations in excess of 0.5 to 0.75 parts per million. This contaminant is unique in that no other atmospheric contaminant has received such scientific assessment." Obviously, some of the concentrations we have encountered since Sunday, October 31, 1948, come comfortably close to and equal these limits. Severe fog may elevate such findings, as has been disclosed by the U. S. Bureau of Mines in their study of the SO_2 content of Pittsburgh air. Again, only by continued study and the correlation of these data with the meteorological conditions prevalent at the time of sampling will any real solution be developed.

Various statements have been made that the people in Donora have for years been dying as a result of the atmospheric contaminants present in the community. Unless they leave town before dying, the records from the Bureau of Vital Statistics of the Pennsylvania Department of Health would not seem to prove these statements. On the contrary, for the last two fully reported years, 1946 and 1947, the deaths from respiratory ailments including pulmonary tuberculosis, influenza and pneumonia averaged only 0.43 deaths per 1000 persons.

DEATH RATES FOR RESPIRATORY AILMENTS AND HEART DISEASE FOR DONORA AND OTHER TOWNS IN VICINITY

	Deaths per Thousand Persons	
	Respiratory	Heart Disease
Westmoreland County:		
Monessen	0.49	3.5
Washington County:		
Canonsburg	1.73	5.2
Charleroi	0.62	4.0
Washington	2.2	9.6
Donora	0.43	2.7

THE facts reported to this point represent a summary of the information that has been obtained up to November 10, 1948, by the Pennsylvania Department of Health, Bureau of Industrial Hygiene. On November 29, 1948, the U. S. Public Health Service, invited to participate in the investigation by the Pennsylvania Department of Health at the request of the United Steel Workers of America, C.I.O., started their extensive study which is to be conducted in cooperation with the Pennsylvania Department of Health, Bureau of Industrial Hygiene. For the future a long range study is contemplated both from a medical and engineering viewpoint. This proposed study has been divided into two phases: first, a preliminary survey and, second, field studies.

In the preliminary survey the engineering phase will be broken down into three substages for the purpose of obtaining information on the following: (1) Topographical, industrial, and domestic activities and meteorological conditions in the Donora area. (2) The materials used in the industries, the industrial processes, and the magnitude of operations. (3) The types and quantities of fuels used for transportation and domestic purposes.

This will furnish an accurate general picture of the area from which we shall prepare a more detailed program under the phase of field studies, both engineering and medical.

The engineering field studies will investigate the sources and amounts of contaminants. These will include studies in the plants to determine what contaminants are formed and studies outside of the plants to determine the magnitude of the dissemination of the contaminants which are produced.

The field medical studies will be directed towards: (1) Obtaining records of cases, both fatal and non-fatal, attended by physicians. (2) Obtaining records of cases unattended by physicians —this is assuming there were persons affected who were not treated by a physician. This information is to be obtained by a house-to-house canvass. (3) A study of the relation of housing conditions to alleged sickness during those few days. (4) An extensive study of mortality records as compared with other cities of similar size in the area. (5) A study of records of respiratory diseases. (6) A study of morbidity and mortality from plant records.

It is obvious that such a study as proposed by the U. S. Public Health Service is comprehensive and will require an extended period of time before completion. It is conservatively estimated that the results of such a study will not be available during the next year.

IN THE meantime, the attention of communities has been directed more forcefully to the subject of industrial atmospheric pollution. The Secretary of Health of Pennsylvania has received many appeals for assistance from a large number of communities claiming to have the components of potential Donora disasters. These cannot go unnoticed and have been referred to the Pennsylvania Bureau of Industrial Hygiene for investigation. Because of the specialized type of work it is proposed to establish a Division of Industrial Air Pollution Control within this Bureau. This proposal has been favorably accepted and approved by the Governor and the Secretary of Health. Through this Division we hope to be able to study in some detail the problem of industrial atmospheric pollution and in time have adequate control measures to the end that we may all enjoy life in accordance with the socio-economic status of our respective communities.

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Federal Medicine Boob Trap

IT SEEMS certain that we are going to take another step on the road to bureaucratic collectivism by the passage of a compulsory health insurance bill, to which President Truman is pledged. The U. S. Public Health Service is for it, as every government agency is always for a vast extension of its powers. The labor unions and farmers' organizations are for it because it sounds good. Industry would like to saddle the Federal government with the expense of workmen's compensation cases. Professional social workers foresee great opportunities for themselves. A mere 150,000 physicians, 90% of whom are against it, cannot buck the trend. Besides, they are supposed to be "prejudiced," on the current theory that those who know most about anything are not reliable witnesses. I am not against compulsory health insurance because it is "socialistic," but because it is the application of national socialism in the least appropriate field. Also, I have lived under such medical systems in England, Austria and Germany, and they were awful. The great joker in all these schemes is that they are put forward as "free," meaning something for nothing. Let their proponents at least tell the truth. What is advocated is compulsory insurance. Every worker in this country will have the cost subtracted from his pay envelope, and added (by his employers) to the price of everything he buys. He will be paying for unused aspirins when he needs the money for oranges. He will be supporting innumerable filing clerks—a horrendous paper staff for 150,000,000 people. When and if he gets ill, he will find himself as one of 50 patients (half of them hypochondriacs bent on getting service for their money) whom a physician must examine in an hour! And if he is really ill—and finds that under the slap-happy methods of overworked doctors, whose fees are assured anyhow, he gets no better but worse—he finally will, in desperation, consult one of those private physicians who refuse to join the assembly line and, atop of all he already has put up, week by week, pay a private fee. How do I know this? Because I have experienced it. Just why this most inventive country seems compelled blindly to copy social measures originating elsewhere is baffling. We need better health service. Granted. We need many, many more hospitals. The existing hospitals need public aid, since the sources of private support are increasingly drained off in taxes. And we need more genuinely free medicine for people in real jams. But before Congress passes any bill for universal sickness insurance—falsely called "health" insurance—it owes it to the American people to tell them exactly what a person with, say, an income of from $2,000 to $3,000 a year is going to have to pay over a working life of 40 years to take care of his illnesses, and just what services the government positively guarantees him in return for his money. Will it, for instance, sign on the dotted line that if his wife is in labor, the government guarantees a bed and a physician at the critical moment? Don't make me laugh! I've lived under these schemes.

—DOROTHY THOMPSON, in *Chicago Daily News*, December 21, 1948.

The Management of the Obese Patient

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I AM SURE that in your practice it is all too common to have people justify their excess weight from scientific knowledge about metabolic and endocrine processes. The fat person has conveniently learned to hide his girth behind the excuse of an endocrine disease. He waddles in, sits himself down, and says, "It's my glands."

What does the fat patient mean? He believes that he has one of the endogenous causes of obesity, such as hypothyroidism, Froelich's syndrome, Cushing's disease, or hyperinsulinism. Actually, these account for but few of the patients who are obese, and even in such cases over-eating plays the major role. For this reason the management of obesity must be in a large measure divorced from the sphere of the endocrinologist and brought to its appropriate place in the practice of medicine. Why is obesity important? The vital statistics given by life insurance companies are well known to all of us and need not be repeated here.

Practically every specialist in medicine is concerned with its complications.

The cardiologist is faced with the burden of excess weight on a damaged heart and the predisposition to hypertension.

The dermatologist is interested in the intertrigo that develops in the skin between the fat folds of the obese patient.

The orthopedist is concerned with the effect when the excess weight is added as a burden to defective or damaged muscles, bones, and joints.

The surgeon is faced with the technical difficulties of operating through heavy layers of fat.

The obstetrician has the problem of the poor tonus and power of the abdominal wall.

THE diagnostic difficulties arise in interpreting dyspnea and in palpating intra-abdominal organs through heavy layers of abdominal fat, as well as in the interpretation of fluoroscopy and x-ray films.

Several methods of treating obesity have been widely practiced. Thyroid extract has been extensively used by physicians and patent medicine interests as a fat reducer. Many obese patients are found to have a low basal metabolic rate, but if the BMR is recalculated in accordance with the ideal weight of the patient rather than his total weight, which includes the inert fat, it will be found that the basal metabolic rate is normal or even slightly elevated. One action of thyroid extract which is often overlooked is that not only are metabolic processes stimulated, but appetite is stimulated as well.

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Another popular treatment is exercise. Unfortunately the reduction of weight by this means is economically unsound and practically impossible for the obese individual. From the physiologist we know the caloric cost of physical exercise, and it is possible to compute the food required to perform a given exercise. How effective will exercise be in reducing weight? The facts are somewhat discouraging. To walk off an ice cream soda, containing about 300 calories requires a 10-mile jaunt in five hours. If he'd rather, the fat patient can shovel 7,968 pounds of sand into a wheel barrow. The loss of weight due to perspirations fools the patient and causes him to rejoice; but the loss is in body fluids, not in fat. The weight so arduously lost is quickly regained by drinking water.

These two methods, then, thyroid extract and exercise, are not satisfactory. To reduce fat it is essential that the caloric intake of the patient be less than his body needs, so that the body requirements of energy may be taken from the fat stores. Obesity is the penalty of over-eating. Again and again the fat patient has heard these words. But he is not convinced. This matter of convincing him is one of the most difficult problems that faces the clinician. A method for the management of obesity which has been successfully used will be described.

THIS method may be illustrated by the case of Mrs. M. She presented herself for treatment on April 12, 1947. She was 50 years of age; her height was 59¾ inches, and she weighed 312 pounds. She had been overweight as long as she could remember. She complained of noises on top of head, dyspnea and palpitation, and recurrent pain in the chest under the left breast. Nocturia of three to four times was present. Menses tended to be irregular, averaging one period every three months. The past history was essentially negative. There was a prominent family history of obesity, diabetes, and cardiovascular disease. Apart from the obesity the only noteworthy physical finding was a blood pressure of 200/112. Blood counts and urines, including post-prandial urine specimens, were normal. On cardiac fluoroscopy the left ventricle was enlarged. A basal metabolic rate was not determinable, for no standards exist by which curves on such obese patients can be interpreted. On her next visit a diet was written for her in long hand by the physician in her presence. During the writing of the diet the patient's food habits and preferences were discussed and utilized in the construction of the diet. Why was she not simply given a copy of a printed diet? What is the purpose of expending time and effort in writ-

ing out a diet for the patient? The answers are these:

1. First, rapport and confidence are promoted by the physicians' personal interest.

2. Second, the patient is made to feel that he is to his doctor a person rather than a disease for which a printed standard prescription will suffice.

3. Third, the patient leaves the office with a diet which he himself has helped to construct, and which embodies his own needs and desires.

To return to Mrs. M. At this same visit appetite depressants were prescribed. During all her office visits continual effort was made to learn and understand the factors responsible for her over-eating. The progress this patient has made in the past 19 months is as follows: She has lost 115 pounds. There has also occurred a fall in blood pressure from its initial high level to within almost normal limits. We do not mean to imply that this necessarily occurred because of the weight loss, for similar fall in blood pressure is not uncommonly observed in non-obese patients with elevated pressures on consecutive visits to a physicians' office. Her other symptoms —noises on the top of her head, dyspnea, palpitation, recurrent pain in the chest, and nocturia —have all disappeared.

Time does not permit us to go into the personal factors underlying this particular patient's obesity, but as a general review here are some of the factors responsible for overeating: (1) Domestic and social insecurities. (2) Sexual maladjustments. (3) Boredom. (4) Worry. (5) Adolescent insecurities. (6) Fear. (7) Suppressed rage. We must recognize that these factors represent only superficial features in the person and in the environment and are expressions of deeper and more fundamental motivations. Essentially, patients become obese because they adjust to the problems of living by utilizing an infantile method—eating.

How is the obese person made to give up this infantile reaction for a more mature one? In the course of his office visits the doctor gradually becomes better acquainted with the patient's life situation and his methods of reacting to it. The patient's reasons for over-eating often become apparent and may even be volunteered as confidence in the physician is gained. For example, in the adolescent, the beginnings of obesity may be clearly related to the development of the maladjustment between the parents that has ended in divorce. Another example is the disillusion found in a marriage that has failed to provide anticipated sexual gratification. Whatever the factors may be it is important that they be carefully considered. There are rare times when it is wiser to discourage the patient from attempting to lose weight, for serious anxiety may be induced by the removal of necessary oral gratification. Only the practitioner who is willing to give the time that such interviews require should attempt the treatment of obesity.

We have found it useful, at times, to have the patient record everything that he eats. The diet diaries are used, not for the purpose of reprimanding the patient, but only to give us the opportunity to study with him the circumstances responsible for such deviations as may have occurred. The physician must not, however, be over-eager to probe. He must be patient and appreciate that the obese individual does not understand the real reason for his over-eating. He must carefully watch for all clues and be prepared to follow them thoroughly, but with delicacy and finesse.

After the obese patient has been thoroughly studied by his physician, and no evidence of endocrinopathy found, the physician writes the diet, and as he writes he discusses the patient's food habits and preferences, and seeks to satisfy the satiety factor by keeping in mind not only the types of foods and their caloric values, but what pleases the palate as well. The doctor teaches food quantities in terms of common household measures and restaurant portions, not in terms of weighed portions. Thus the patient may utilize his diet wherever he eats. The patient is made to understand that when he is at parties he will be wise not to draw the attention of his hostess or his fellow guests to the fact that he is dieting and thereby invite the hostess's coaxing—"Just try this special cake. Tonight you're at my party. You can diet tomorrow." The physician advises him to partake of a small portion of everything when he is a guest. At other times it will be expedient to eat everything and thus avoid ridicule. The diet the physician writes should embody the patient's own needs and desires and be adapted to whatever social situation he may meet.

It must be emphasized that the construction of the diet is not the end of the treatment—it is the beginning. We must not say, "Now it is 'up' to the patient." It will continue to be "up" to both him and his physician. The patient cannot be expected to step easily into his new regime—to firmly reject from the beginning the eating habits to which he has long been accustomed

Radio, magazine, and pamphlet campaigns are now going on, sponsored by life insurance companies, to educate the obese patient to seek medical supervision for the reduction of weight. The interest of the life insurance company is a practical one, for, as treatment with the antibiotics and with chemotherapy progresses, the life of the insured is prolonged so that the causes of death are now more related to degenerative changes. It is well known that degenerative changes occur earlier in the obese than in people of normal weight.

I hope that I have shown you this afternoon that the only successful way of treating obesity is from the point of view of personal attention by the physician to those factors which have been responsible for intensifying the appetite for food. The guidance of the physician with dietary measures should be a personal one. It is the doctor who must be a source of strength to his patient until the patient has strength of his own.

Ultra-Violet Exposure from Germicidal Lamps

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THE USE of ultra-violet germicidal lamps in food handling industries has become prevalent in the last few years. The lamps are usually the low pressure mercury type, emitting radiation in the region from approximately 2000 to 3000 Angstrom units, and producing their major output at 2537 Angstrom units. These ultra-violet radiations in this range have been found to exert a powerful bactericidal and fungicidal effect. For this reason, a number of food industries have adopted their use. The principal users are the meat industry, the baking industry, breweries, restaurants and eating places.

In the meat industry, the use of the lamp permits a higher refrigerator storage temperature which greatly cuts down weight losses in the meat through dehydration. A temperature of 34°-38° F is required if the lamp is not used; at this temperature, the absolute humidity is low and causes the meat to lose both weight and juices. With the use of germicidal lamps, the temperature in the cooler is kept at 40°-45° F; at this temperature, the absoiute humidity is considerably higher and the weight loss of the meat is kept at a minimum.

In the baking industry, the major problem is prevention of mold contamination. A warm atmosphere must be maintained in the dough room to promote the growth and fermentation by the yeast. This provides ideal conditions for the growth of mold. Germicidal lamps in bakeries are used to control this contamination in the following operations:

1. Irradiation of dough room to kill molds and wild yeasts floating in the air.
2. Irradiation of baked goods during passage from the oven to cooling room.
3. Irradiation of the product on the cooling racks or conveyor-type coolers.
4. Irradiation of area or room where the goods are wrapped.

In the eating and drinking places, the lamps have been used to sterilize eating and drinking utensils. The germicidal lamps are recommended to replace either the superheated steam or the chemical method for sterilizing the utensils. In addition, the germicidal lamps are recommended for the sterile storage of glasses and other cooking utensils.

Other uses of ultra-violet germicidal lamps are sterilization of air in hospital operating rooms, prevention of molds in manufacture of cosmetics, prevention of molds in breweries, prevention of contamination in the production and packaging of vaccines, serums, etc.

It is well known that excessive exposure to ultra-violet radiation after several hours delay will cause deep-seated pains in the eyes, sometimes redness of the eyes, difficulty of focusing the eyes on any object and sometimes temporary blindness. In common ultra-violet eye burns, recovery occurs within a few weeks' time. Excessive ultra-violet radiation on the skin causes erythema (reddening) and burning, generally without tanning. The range of wave lengths capable of producing tanning is from 2800 to 3300 Angstrom units. Most germicidal lamps produce wave lengths below 3100 Angstrom units, with the greatest percentage of radiant energy at 2537 Angstrom units.

Instruments for making measurements of ultra-violet radiations in the germicidal range are now commercially available. The radiation is expressed in energy units, generally microwatt hours per square centimeter.

The American Medical Association Council on Physical Therapy[1] recommends that infants should not be exposed to a greater radiation than 2.4 microwatt hours per square centimeter per 24 hours. For adults, acclimated to ultra-violet radiation from the sun, experience[2] indicates that the exposure may be increased to 5.0 microwatt hours per 24 hours with skin reddening occurring in very few cases.

In installing lamps, most manufacturers recommend that the distance between the lamps and the object being irradiated be as short as possible and that the lamps be installed and operated only under conditions which provide adequate protection for the eyes and which minimize as much as practical the direct exposure to the skin. Improper installations by incompetent persons have resulted in eye complaints and erythema in the worker. The following are two typical cases:

CASE 1: A large soft drink dispensing store installed 11 ultra-violet drinking glass sterilizers at the drink dispensing counter. The dirty glasses were washed, rinsed, and placed upside down in circular racks holding nine glasses. The glass-filled racks were placed to dry on an inclined conveyor chute holding about six racks. At the end of the chute, an ultra-violet sterilizer lamp was placed so that the lamp radiated upward beneath the rack. The dried glass racks were removed from the chute and stored on another ultra-violet sterilizer on the dispensing counter. The store employed up to 11 girls to dispense drinks over the counter. The initial installation of 11 lamps was made with no shielding or other precautions to protect the employees' eyes. The morning following the first day's operation, using the ultra-violet germicidal lamps, all counter employees were absent. Complaints from absent employees were of severe pains in

eyes, burning eyes, headaches, blurring of vision and inability to focus eyes. Management immediately installed transparent plastic shields on three sides of the sterilizers. Minor complaints persisted from time to time. An investigation with an ultra-violet meter indicated the following exposure at the eye level of the employees:

	Microwatts per Sq. Cm.
15-watt sterilizer with no glasses	20-52
15-watt sterilizer with 3 glasses out	9
15-watt sterilizer with 2 glasses out	6
15-watt sterilizer with 1 glass out	5
15-watt sterilizer with all glasses in	.15

In this exposure, it can be noted that the racks full of water in themselves afforded ample protection to the worker's eyes. Under certain conditions where the sterilizer lamps were not shielded by glass-filled racks or were only partially shielded by glass-filled racks or were only partially shielded by incompletely filled racks, exposures sufficient to cause eye irritation resulted.

CASE 2: A large bakery specializing in the manufacture of pies installed a large number of ultra-violet lamps at several food processing operations. One operation involved the handling and packaging of small individual pies. The pies were removed from metal pans by hand and then placed in small waxed-paper plates. The pies and plates were then placed on a canvas conveyor belt which conveyed them farther down the line, where other operators placed them in transparent paper bags. The entire handling operation required about six girls. Because of the large amount of handling, it was felt that ultra-violet radiation would be valuable in reducing the mold and bacteria contamination. An enclosed reflector box containing four 18-watt cold cathode tubes was installed directly over the conveyor belt. The reflector was placed close enough to the belt so that the sides of the reflector protected the workers' eyes from the radiation. The placing of the pies on the belt, however, required that the workers' hands lie directly under the lamp at least 50% of the time. Shortly after the installation of the lamp, workers' hands became red, sore and sunburned. The use of the lamp was discontinued by management. Results of ultra-violet measurements were as follows:

On conveyor belt: 40-70 microwatts per sq. cm.

At edge of conveyor belt: 15 microwatts per sq. cm.

At operator's eyes: 1.6 microwatts per sq. cm.

The operators worked a six-hour shift. A time study indicated that during three hours of each shift the operators were exposed to 40-70 microwatts per square centimeter. The lamp was put back in operation and the exposure controlled by shielding off the portion of the conveyor where the workers placed their hands.

PROPER installation of the lamps is essential to the control of exposures from germicidal lamps. It is desirable that each installation be supervised or inspected by competent persons versed in the technology of the subject and equipped with suitable means for measuring radiation intensities. Where lamps are installed for air sterilization, it is essential that the installation be made so that no one adjacent to the fixture in a normal position can see the lamp, either directly or by primary reflection from specular reflecting surfaces. In certain installations, unshielded lamps may be used if the time factor is small and the suggested limit of 5 microwatt hours per 24 hours is not exceeded. In walk-in coolers for meat storage, it is customary to mount unshielded lamps in the enclosures in order to accomplish a general irradiation. Although the butcher is exposed to direct radiations of the lamps, the 5 microwatt hour exposure is generally not exceeded where the butcher uses his cooler for storage only and his time spent in the cooler is only for removing meat. Where work is done in the cooler for any length of time the lamps should be turned off. Some walk-in boxes have automatic switches to shut off ultra-violet lamps when the box is occupied. On installations where special precautions are necessary, common glass, cloth, wood, metal or plastic partitions can be used for shielding. Individual protection of face and eyes can be afforded by glass or plastic goggles or plastic face shields. Special skin creams can also be used.

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Lead Poisoning Caused by a Bullet Embedded for Twenty-Seven Years

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AN UNUSUAL case of lead poisoning, a subsequent encephalitis and ultimate death occurred, 27 years after, as a result of a bullet embedded in the knee following a shooting accident. The case is of interest because no symptoms of lead intoxication were evidenced until shortly before death, many years later.

There had been an apparent recovery from the original gunshot wound and the only complaint 27 years later was a long standing arthritis and deformity of the right leg, the site of the previous injury.

Report of Case

HISTORY: H. W., a colored woman, aged 66, was admitted to Cook County Hospital on November 11, 1944, complaining of epigastric pain and vomiting for the past nine days. Pain was located in the mid-epigastrium, stinging in character, and lasting for two to three hours, more severe at night. Emesis occurred about three times a day, giving an impression of an abdominal neoplasm. She also complained of pain in the right knee from old arthritis.

Physical Examination: Relevant observations were limited to the following: There was a deformity of the right knee. The patient was edentulous, the gums, tongue and pharynx sore. The temperature was 99.8°, pulse 86 and respiration 30.

Laboratory Examination: The red blood count was 2,580,000; white blood count 9,600; hemoglobin 49%. Differential count gave neutrophiles 71%; eosinophiles 1%; basophiles 1%; monocytes 4%; lymphocytes 24%. Seven nucleated red cells were noted and 362 stippled red cells. The urine was negative for albumin and sugar but contained 0.11 milligrams of lead per liter. Stool test was negative for blood. Kahn test was negative. Icteric index was 8. Roentgenologic examination of the right knee-joint showed marked destruction and presence of metallic particles. Electrocardiogram disclosed a left axis deviation and myocardial damage. The hematological report gave a suspicion of lead poisoning and led to further questioning of the patient. She stated that 27 years prior to this examination, she was accidentally shot in the right knee by her husband.

Course: Patient was given calcium gluconate and sodium citrate intravenously. On December 12, as the anemia was not improving under liver and iron medication, 500 cc. of citrated blood were given, followed by 700 cc. of normal saline. The patient at this time developed mental confusion, nervous excitability and dullness. She complained of headaches, exhaustion, and pain in the abdomen, and gradually was unable to speak. It was not possible to determine if she understood what was said to her. There were no convulsions. As she became semicomatose, Hartman's solution was administered. In spite of all treatment, the patient expired on December 28, 1944, her 47th hospital day.

Report of Autopsy: Dr. Loeffler, pathologist of Cook County Hospital, performed an autopsy which revealed the following: A body of a well developed, somewhat obese colored woman, approximately 66 years of age, with no jaundice or edema. There was a scar over the patella region of the right leg. Externally, both knees showed some deformity. The myocardium of the heart was light brown. Upon the endocardium and valves, especially the descending portion, were delicate patches of arteriosclerosis. Lung-cut surface showed many areas of bronchopneumonia of both lower lobes.

Bone marrow of the femur consisted only of fat; the bone marrow of sternum completely replaced by fat marrow. The left knee-joint was the site of a deforming arthritis with degeneration of the cartilage of the femur and exostosis of the tibia. The suprapatellar bursa was thickened up to a diameter of 5 mm., and contained 20 cc. of a greasy glistening material (cholesterol). The right knee-joint, the site of the old injury, also showed deforming arthritis, with thick dense connective tissue strands obliterating the synovial space. Between these bands of scar tissue, three bony particles, apparently parts of the patella, could be found. The connective tissue, in some places, showed a marked black discoloration, and black irregular sized metallic particles (lead), one piece measuring about 0.8 ctm. by 2.6 ctm., another piece 1.3 ctm. by 0.9 ctm., were found, between connective tissue bands.

The liver showed fat infiltration. Many kidney glomeruli were well preserved, some showing thickening of the Bowman's capsule and shrinkage, and a few completely obliterated. In some places there was severe degeneration, complete necrosis and end arteritis. The interstitial tissue was increased, in some places infiltrated with round cells. The tubules contained casts.

Microscopic Report of the Brain: A section of the cerebral cortex disclosed edema of the leptomeninges, prominence of cortical capillaries with occasional instances of hyperplasia of endothelia, or adventitial cells in the smallest blood vessels; a few brown pigments containing scavenger cells in the lymphatic spaces of subcortical vessels In sections through the cerebella cortex (both vermii and hemispherical), and through the dentate nucleus, no cellular infiltrative changes were present in the meninges or nerve tissue; but slight swelling and prominence of capillaries was seen, especially in the molecular layer of the cortex.

Anatomical Diagnosis was as follows: Chronic lead poisoning; traumatic arthritis of right knee-joint (after gunshot); chronic bursitis of left suprapatellar bursa; chronic arthritis of left knee-joint; general anemia; arteriosclerosis of aorta and peripheral arteries; bronchopneumonia of lower lobes of both lungs and edema of entire lungs; fatty changes of liver; fat marrow in sternum; general adiposity.

An examination of the urine just before death, contained 0.19 mg. of lead per liter; the liver contained 7.715 mg. of lead per 100 grams of sample; the kidney 2.00 mg. per 100 grams; the heart 0.770 mg. per 100 grams; the sternum 0.915 mg. per 100 grams; the spinal cord only a trace.

The amounts of lead found in the kidney, the sternum, and ribs, were the amounts usually found in people who work in lead industry. However, the amount of lead found in the liver and heart was three times that found in cases dying with symptoms of lead intoxication, and with a history of an exposure to lead.

Discussion

THE latent period between exposure to lead, either by industrial contact or injury by gunshot, and the manifestation of symptoms of lead intoxication, is of interest. The case reported was of special significance in this respect, because of the long interval of 27 years between a gunshot wound in the knee, with the bullet embedded, and the onset of symptoms.

The patient had recovered from the original injury, and until admittance to the hospital, many years later, had complained only of an arthritis of the right leg. This was later designated on anatomical diagnosis, as traumatic arthritis of the right knee-joint, induced by gunshot, although there was also found to exist a chronic arthritis of the left knee-joint.

The hematological report in this case was strongly indicative of lead poisoning. The amount of lead found in the kidney at autopsy was not outstanding, but the amount found in the liver and heart was three times greater than usually found in cases dying of lead intoxication and with a history of exposure to lead.

Oliver[1] had a latent case of plumbism in a woman who, when 19 years old, suffered from lead colic blindness and paralysis; left work; recovered; married and had several children. Seventeen years later, without having done any lead work during this interval, she had an attack of headache and ocular paralysis with diplopia, and was found to be eliminating lead in the urine.

Larzell[2] reports a case of a man who, while working as a foreman in a sheet lead works, had such severe colic that he almost died and was forced to give up his position. For 16 years he had no contact with lead, but he was never as strong as before and suffered more or less "rheumatism." Three months before Larzell saw him, he had lobar pneumonia and as the lung was slow in clearing up his physician gave him iodid of potassium, whereupon a typical foot drop developed.

C. Powell White[3] was the first to draw attention to lead in the urine in war nephritis.

Loeper and Verpy[4] had found lead in the urine of six out of 16 soldiers to the extent of ½ to 1 mgm. per liter of urine. The men were passing 1 mgm. of lead in 24 hours by the kidneys, a small quantity, but sufficient in time to derange the function and probably alter the structure of the kidneys. Absorption of metallic lead from a bullet in the body, is slow. It was not until three to four weeks after soldiers had been wounded that lead was found in the urine.

Kober and Hayhurst[5] state that "lead bullets and shrapnel retained in the body can thus become a source of plumbism or of such a condition of bodily health, as may explain why wounds apart from the circumstance of a foreign body do not readily heal."

Leschke[6] cites six cases of gunshot injuries, in which the missile remained in the body for several years, later producing symptoms of lead intoxication. In one case a man 34 years of age received a shrapnel bullet in the head of the right humerus. There was no noticeable disability for the next 10 years. At this time he developed symptoms of lead intoxication. After mobilization of the lead depots by administration of sodium bicarbonate four times a day for three days, punctate basophilia appeared, though previously they had not been detectable. After mobilization the urine contained 0.17 mg. of lead per liter one day, and 0.055 on another.

The foregoing data imply the strange phenomenon, that lead may remain in the body for a very long period before appearing in the urine, and manifesting the ultimate symptoms and death from absorption of this metal.

Summary

A CASE is reported of death from encephalitis, superinduced by lead poisoning, from a gunshot injury and a bullet embedded in the knee, following a 27 year, symptom free period.

Similar instances of lead intoxication are cited from the literature, in which absorption of lead, and the onset of symptoms, were very slow. It is pointed out that absorption of metallic lead from bullets and shrapnel remaining in the body, may become a source of plumbism, derange kidney function and possibly retard wound healing.

Recurrences of latent cases of lead poisoning, apparently recovered are discussed.

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Operative Treatment of Acute Subdeltoid Bursitis with Calcification

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THE purpose of this report is to advocate the surgical approach to the treatment of acute subdeltoid bursitis with calcification. The procedure employed is extremely simple, rapid and dramatic in its effect, has not been followed by recurrence, and appears to avoid the development of chronicity which occasionally occurs with other methods. It consists in (1) the evacuation of the bursa through an incision not more than 3 cm. long and frequently less, and (2) the exploration of the musculotendinous rotator cuff of the shoulder through the floor of the bursa.

Various forms of treatment for the syndrome of acute subdeltoid bursitis with calcification have been reported in the literature. These may be classified under three general headings:

1. Conservative: rest, sedatives and opiates, and various local applications,[1,2] physical agents such as diathermy, iontophoresis and infra-red radiation;[3-10] the use of specific chemical agents including ammonium chloride,[11] iron cacodylate,[12-13] and neostigmine.[14]

2. Radiation: single or multiple dose technics.[15-27]

3. Operative: needling of the bursa with or without irrigation with various solutions of novocaine or saline;[28-34] surgical exploration and curettement of the bursa and rotator cuff of the shoulder.[35-46]

Some writers recommend conservative therapy before resort is had to operative means, whereas others follow a varied routine.[47-55]

All of the regimens described in the literature appear to give relief or cure in the majority of patients treated, the variable being the length of time before the effect is obtained. In fact, it has been stated[46] that acute subdeltoid bursitis with calcification will probably go on to cure even if untreated. However, the patient is usually in such severe pain and so completely disabled that he seeks the physician for immediate relief. Furthermore, the residua in the form of chronic shoulder pain and disability are important to the patient economically. Because of the rapid and permanent relief obtained with this method, it is felt that the operative treatment is the one of choice for this condition.

Anatomy and Mechanics of the Bursa

A BURSA is a self-lubricating sac interposed between two structures to facilitate motion between them. The subdeltoid (also called subacromial) bursa is somewhat complex in that proximally it lies under the coraco-acromial ligament and acromion process of the scapula and distally under the deltoid muscle. The floor of the bursa covers the upper and outer three-fourths inch of the greater tuberosity of the humerus, the bicipital groove, and the cuff formed by the tendons of insertion of the short rotator muscles of the shoulder, the supraspinatus, infraspinatus, teres minor and subscapularis. The floor of the bursa is so intimately applied to the rotator cuff that to all intents and purposes it is part of the cuff itself. The bursa does not connect with the shoulder joint except when the rotator cuff is torn through.

The bursa is generally held to be 1½ inches in diameter,[46] variations in size depending on the distention of the bursa with fluid and also on the various states of preservation encountered in cadaver preparations. Functionally it allows for smooth motion between the deltoid and the rotator muscles, thus facilitating the acts of abduction and rotation. The acromion process and the greater tuberosity of the humerus do not come into contact during the act of rotation. However, during abduction, the tuberosity slides up under the acromion process, thus bringing these two bony prominences into apposition as the arm is raised from the side. Skinner[56] holds that the supraspinatus muscle is concerned with the first stages of abduction (15-30°) and that the deltoid muscle supplements its action thereafter to complete the abduction. The other muscles of the cuff are concerned with rotation primarily.

Pathologic Considerations

IT MAY be stated at the outset that the term "subdeltoid bursitis with calcification" is a misnomer. The consensus is that calcification rarely appears in the bursa as an isolated or initial finding. The calcific process begins in the tendons of the rotator cuff, principally the supraspinatus, and, if present at all in the bursa, occurs secondarily by rupturing through the floor of the bursa from the tendon underlying the floor. It has already been pointed out that the floor of the bursa is almost inseparably attached to the musculotendinous cuff.

Medical investigation into the pathologic anatomy of this condition is of recent origin. Although probably as old as the human race, the syndrome was first discussed at length by Duplay[57] in 1872 under the heading of scapulohumeral periarthritis. Considerable impetus to the study of calcified bursitis came with the discovery of the roentgen ray at the turn of the century. Since then, although many reports have appeared in the literature, the number of basic investigations into the pathogenesis of the disease has been relatively few. The variations in theory as to etiology are displayed by the variety of names, both popular and scientific, which have been applied to the condition: Duplay's disease (periarthrite scapulo-humerale), subdeltoid or subacromial bursitis, peritendinitis, neuritis, rheumatism, tendogenetic disease, peritendinitis calcarea, supraspinatus tendinitis, lime gout, bursitis, etc.

Briefly, present theory holds that an avascular tissue such as the supraspinatus tendon will develop necrosis and subsequent calcification either because of its own poor blood supply, i.e., primarily or when subjected to the wear and tear of continuous use and minor traumata. Skinner's investigations[56] disclose that the supraspinatus tendon in infants is muscular up to its insertion into the greater tuberosity of the humerus. With advancing

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age the muscle becomes more tendinous, the cuff at the shoulder taking on an aponeurotic appearance. This fact would imply that the disease occurs in an older age group, and Rogers[58] corroborates this in a study of 100 cases of bursitis in which the average age was 48, no patient being under 30.

Sandstrom and Wahlgren[59] postulate that necrosis due to avascularity is the primary factor in the development of calcification. In a pathologic study of 12 cases with calcification, eight occurring in the shoulder, they found marked vascular changes in the form of hypertrophy of the media of the vessels in the tendinous capsule and ligamentous tissue, with luminal narrowing and occlusion of small arteries and even thrombi in some of the vessels. They state that "on the basis of the pronounced vascular changes and of the marked alternative changes we assume the disease to consist of local tissue anemia with impairment of vitality. The lime deposits are secondary to these alterations." These conclusions are in line with the earlier work of Moschowitz[60] who noted extensive hyaline degeneration and necrosis in the tendinous tissue, with secondary calcification, the necrotic process being held to arise from actual death of the tendon.

The great volume of study, however, leans to the theory that calcification arising in the supraspinatus tendon is the result of trauma superimposed on an avascular tissue. Thus Hitzrot[61] believes that injury is the commonest cause of disease in this area. Relatively minor abuses such as wrenches and twists of the shoulder joints, blows upon the shoulder, falls upon the hand or arm with the arm in partial abduction, or overuse of the arm in abduction, may contribute to trauma of the rotator mechanism. Meyer[62,63] has written at length about the wear and tear that the structures in the shoulder undergo from continuous use, the "hour to hour, day to day, month to month, year to year, and decade to decade effects."[63] He states that "the reparative powers of the structures concerned often are exceeded and that repeated slight trauma may provoke an obliterative endarteritis and sclerosis."[63]

Codman,[46] perhaps the outstanding authority in the field, has suggested that the calcification appearing first in the tendon and later rupturing into the bursa originates as the result of continued minor insults to the rotator muscles, particularly in occupations and avocations requiring continued abduction or rotation of the shoulder. Small traumata are produced in the tendon by impingement of the rotator cuff and the greater tuberosity of the humerus on the acromion process during abduction and rotation, the tendon becomes frayed, and the injury heals with calcification. That such tears of the supraspinatus tendon are more common than usually thought was brought out by Codman and Akerson[64] in a series of 52 autopsies at which 100 shoulders were examined. They found a total of 39 tears in all, impressive evidence of the frequency with which this tendon may be injured. However, Codman states that he has never seen a fresh tear as evidenced by bleeding or torn fibers in any of his acute bursitis cases. This opinion is substantiated by Carnett and Case,[39] who found no evidence of fresh injury in a series of 50 operative cases.

Carnett and Case [39] studied the tissue removed from 26 shoulders and have given an excellent description of the pathogenesis and histology of the lesion: "The sequence of changes in the tendon seems to be a primary interference with the blood supply, never very abundant, and then ischemia and necrosis result. In this necrotic tissue are deposited calcium salts which can be shown by x-ray examination. In many instances, but not in all, an inflammatory reaction is excited. As the nutrition of the tendon is impaired the fibers involved undergo hyaline degeneration and often break up into fragments of varying size. This necrosis may occur in a number of foci, and in the dead tissue calcium salts are deposited. In one case from 500 to 1,000 such deposits were found. This deposit varies from microscopic amounts to collections of considerable size. It is often soft and cheesy, resembling caseous necrosis; sometimes it is fluid or semifluid like pus; in other cases it is firm and brittle, necessitating decalcification before section. Cultures show it to be sterile." Chemical examination of the material shows it to be a mixture of calcium phosphate, carbonate and oxalate, with other minerals such as iron and magnesium present in minute amounts.

The microscopic findings vary from extensive granulations to a scattered infiltration of a few cells. Since the lesion is noninfectious, there are few polymorphonuclear leukocytes. The lymphocyte, plasma cell and large monocyte predominate. In many instances foreign-body giant cells are found.

The theory that suppuration occurs in the bursa or that the bursa is the lodging place for bacteria from a distant focus of infection has been ruled out by many studies. Microscopic examination of the bursal contents consistently rules out abscess formation; cultures and smears of this material are negative for bacterial growth. In only one case in 450 did Patterson and Wilson[32] find evidence of infection. Others have consistently confirmed these results.

Diagnosis

Two indications must be present for this operation to be performed successfully. The first is pain. Typically this is severe, located just distal to the acromion process, and frequently radiates down the arm to the fingers. It produces the characteristic disability of difficult or impossible abduction or internal rotation of the arm. Occasionally there is an associated history of exertion or strain bringing on the attack, but for the most part the onset is sudden and not related to any antecedent trauma. The patient will state that he was awakened from his sleep by the pain, or that it occurred while he was putting on his overcoat or driving his car.

Ferguson's description[65] of the patient with an attack of this disease is very graphic: "The pain is completely disabling; the arm is hugged to the side and cradled by the well arm, because any movement increases the severity of the pain. Sleep and rest are impossible for the sufferers; no position, sitting, standing or lying, seems to offer any relief; even relatively large doses of morphine give only temporary improvement. The pain is usually most acute over the greater tuberosity but also radiates down the arm and upward over the shoulder and lower neck. The region of the deltoid insertion is often described as the site of the most intense pain." Codman[46] has attributed this to a tonic spasm of the lower deltoid fibers. Haggart and Allen[38] term it a reflex spasm of the deltoid.

The second indication for operation is the roentgenologic demonstration of calcification in the shoulder region. The calcium will be deposited in varying degree, size, density and coalescence. It

may be one huge mass, several moderately large groups, or a lot of small particles. From its relation to the greater tuberosity, it is often possible to determine whether the calcium is in the bursa or the tendon.[40] Certain features of the radiographic technic should be emphasized in order that the calcium may be brought into relief and not hidden by the head of the humerus. For one thing, at least one film should be taken with the arm in complete external rotation. Lewis[66] has recommended an oblique projection with the patient's shoulder against the cassette and the body at an angle of about 30°. Bosworth[43] suggests fluoroscopy first, observing the shoulder through a full range of motion and taking spot films where deposits are seen.

The fact that calcification is present in the tendon does not necessarily mean that the patient has pain. Roentgenograms occasionally reveal the incidental presence of calcification in a patient presenting himself for another complaint. Thus Bosworth[43] found calcific deposits in 165 out of a total of 6,061 employees (2.7%) on routine fluoroscopy of the shoulders, only a small minority of whom had complaints referable to this region. "Clinical symptoms may presumably occur at any stage of this pathologic process. On the other hand, there is ample evidence to prove that the entire process may progress to the extent of forming large deposits without giving rise to clinical symptoms."[39]

Ferguson[65] explains the pain mechanism as follows: "An area of calcification, usually in the tendon of the supraspinatus, suddenly becomes the seat of an acute inflammatory process which produces tension in the unyielding fibers of the tendon, an acute inflammatory reaction in the overlying bursa, and secondary spasm of the adjacent muscles."

Operation

THE operative procedure is a simple one. It may be done under local anesthesia but preferably under intravenous sodium pentothal. The patient is in the anatomic position of palms facing anteriorly and the elbow joint of the affected side flexed to about 90° to facilitate rotation at the shoulder joint. A sandbag under the shoulder aids in this maneuver, although it is not absolutely necessary. After the operative site is painted and draped, the tendon of the long head of the biceps is palpated on the anterior surface of the shoulder and a vertical incision 2 to 3 cm. long is made in the skin just lateral to the tendon and 2.5 cm. below the tip of the acromion process. The deltoid fibers are carefully split and retracted until the roof of the bursa is exposed. The bursa may appear thin and shiny, or it may be thick and dull; it may be tense and distended, or appear collapsed; frequently a whitish appearance may indicate the presence of calcium.

The bursal roof is incised longitudinally and its contents evacuated or washed out with a Dakin syringe and saline. Occasionally one large mucoid glob may be present, or there may be a thick white material which has been likened to toothpaste. Gritty bits of calcium may likewise be found.

When the bursa has been emptied, the tendinous cuff of the short rotator muscles is inspected by manipulating the bent elbow so as to rotate the shoulder. In this way both the medially placed subscapularis and the laterally placed tendons are brought into view in turn without enlargement of the incision. If any part of the cuff contains calcium, it will be visible as a shiny plaque quite distinct from the tendon itself. A linear incision is made in the tendon over this plaque and in a direction parallel to the axis of the tendon fibers. This will cause the calcium to be extruded and the defect in the tendon may then be explored further by gentle curetting and irrigation with saline.

In closure, no attempt is made to suture any tendon fibers, bursa or deltoid muscle. One or two sutures of fine chromic catgut are placed through the fascia of the deltoid muscle, and the skin is closed in routine fashion. A small dressing completes the operation.

The patient is kept in the hospital for 24 hours. He is encouraged to move his arm as soon as he comfortably can, to eat by himself, and to comb his hair. On discharge he is instructed to carry out pendulum exercises frequently, using a weight or flatiron and allowing his arms to swing freely when he bends forward from the waist. The patient returns to work as soon as he wishes.

Results

IN A SERIES of 38 cases there have been only two failures. Practically all of the patients have been able to move the arm fairly freely the next morning and begin the pendulum exercises without too great discomfort. There has been no postoperative morbidity or mortality. No cases of chronic disability or frozen shoulder have developed. The vast majority of these patients have been back at work after three or four days and have voluntarily expressed the opinion that the operation was satisfactory.

In accounting for the failures, the obvious reason probably was the failure to get rid of all the calcium. In one of these cases a second operation was performed the next day, and, as shown by a preliminary roentgenogram, a pocket of calcium was found on the extreme lateral aspect of the shoulder. This had been overlooked at the preceding operation and its removal was followed by marked relief.

Summary and Conclusions

THE operative treatment of subdeltoid bursitis with calcification is advocated. An incision 3 cm. in length at most is employed.

2. The anatomy and mechanics of the bursa are described.

3. The theories as to pathogenesis of the disease are discussed.

4. The indications for operation are given.

5. The operation itself is reviewed in detail.

6. A series of 38 patients have been operated upon. Complete relief was obtained in 36. There were two failures, and in one of these a successful second operation was performed to evacuate a calcific deposit which had been missed previously.

[NOTE: As originally published in *Medical Annals of the District of Columbia*, July, 1948, this article was accompanied by an extensive bibliography. Copies of this bibliography may be obtained by writing to INDUSTRIAL MEDICINE, 605 North Michigan Ave., Chicago 11, Illinois.—ED.]

Canadian Industrial Medicine
—Abstracts of Industrial Medical Papers delivered at the 79th Annual Meeting of the Canadian Medical Association, Toronto, Ontario, Canada, June, 1948—

Reported by
C. O. SAPPINGTON, M.D., DR. P.H.

THREE of these four papers are from the Section on Industrial Medicine of the Canadian Medical Association; one is from the Section of Urology.

DR. R. G. BELL, of Toronto, spoke on "Industry as a Medium for the Protection of Mental Health."

'The approach to the health problems of a particular industry is as diverse as the personalities involved. As a medical group we have at least three clearly defined responsibilities:

'First, to acquaint industrial leaders with the social sciences. Industry has progressed to the degree that management has had the courage and ingenuity to translate new scientific fact into general practical reality. Psychology and sociology can be as profitably applied to industry as chemistry, physics or engineering. Industry, rather than universities, professions or governmental agencies must take the lead in social stabilization if the desired goal is to be achieved in time.

'Our second responsibility is to see that adequate training for the promotion of health in industry, at both the undergraduate and post-graduate levels, is provided. At the present time, the industrial medicine section of the Ontario Medical Association is proposing to the four medical schools in Toronto an educational program of this nature.

'Our third responsibility is immediately to enlist the aid of authorities in mental and social hygiene. We must attempt to correlate our efforts with those of civic, provincial and dominion mental and social hygiene committees.

'We must have the courage to consider the possibility that we have been placing the cart before the horse in our hygienic efforts to date. It is possible that the social framework must be first stabilized before any constructive effort in mental hygiene will be possible. If this is so, then the effort of those concerned in the promotion of mental health must be directed more definitely toward industry.'

DR. C. O. SAPPINGTON, of Chicago, discussed "Prevailing Practices in Industrial Health Programs."

This field study included 278 establishments in 33 widely scattered states (a few in Canada), the range being from plants having only a few employees to those having many thousands; a wide variety of products and services were represented. A total of 1,180,551 persons was involved, of which 73% were men and 27% women. (The final report is now available through the Industrial Hygiene Foundation, Pittsburgh.)

In summary, the findings were as follows:

1. A plurality of plants did pre-employment, return-to-work and periodic examinations, and provided a dispensary service—these are apparently well-established technical procedures in a health program. The trend was generally upward as plant population increased. Exit examinations were done in a minority, except in the largest groups.

2. Safety and sanitation procedures were carried out in a plurality of all plants—these, too, are older and fairly well-established functions. Instruction in health and safety principles, and industrial hygiene work were done in a minority of plants under 1500 population, but in a majority of plants over 4000 persons. Dental services were infrequently used in most establishments, except in the larger plants, which showed a plurality of all of the previously mentioned functions. The general trend was upward except for dental services.

3. The supervision of the correction of physical defects, case-findings, and mental hygiene were done only in a minority of all plants, showing a slight upward trend as the population of the plants increased. Even the largest groups showed a minority of these functions.

4. Regular health department reports, and the giving of examination information to employees, were done in a plurality of most plants (with a few exceptions in some small groups), the trend being generally upward as size of plant increased. Medical control of health records and the giving of industrial hygiene information to workers were done in a minority of most plants (except the largest ones), the trend being generally upward as the population of the plants increased. The largest plants were the only ones with a plurality of all these activities.

5. In the three categories, (a) the health department having final word on health problems, (b) placing the three departments of health, safety and industrial relations on a par administratively, (c) the health department reporting direct to top management, there was a minority of all plants indicated, except for a slight majority of health departments having the final word in some of the largest plants. The size of the plant group apparently had no influence here on the incidence of these activities.

6. For the most part, physicians were in charge in a minority of plants under 2000 employees, where non-medical persons were in charge, and vice versa. Nurses figured very little here, but were found mostly in charge in the smallest plants.

7. Salaries seemed to be the most stabilized form of expense, there being more variations in maintenance costs and original investment costs. Costs increased with an increase in the number of persons served, beginning at the 1500 employee level; below that, the size of the plant appeared to be insignificant.

Finally, the so-called "average" plant in this series:

1. Provided pre-placement, return-to-work, periodic examinations, and a dispensary service.

2. Engaged in safety and sanitation services and did industrial hygiene work.

3. Rendered regular health department reports and gave examination information to employees.

4. Found the per capita cost for health services to be from $10.00 to $12.00 per year.

DR. W. H. CRUICKSHANK, of Montreal, spoke on "The Changing Status of Industrial Medicine."

'One of the most significant trends in our postwar industrial development is a growing recognition on the part of management of the importance of health supervision in maintaining production and increasing efficiency. Industry is looking to the medical profession for guidance in this field.

'Coincident with this changing attitude of management regarding the physician in industry has been a changing attitude on the part of labor—with increasing appreciation of the need for health supervision it is demanding such services.

'The medical profession, however, has not realized to a similar extent the opportunity—medical students are graduating and physicians even entering industry still regarding industrial medicine as synonymous with traumatic surgery. This is evidence that the undergraduate training in this field is inadequate.

'A study of official statements of the American Medical Association, the British Medical Association and the Committee on Industrial Medicine of the Canadian Medical Association leads one to the conclusion that the approach to adult health problems lies in the direction of (1) early diagnosis of actual or incipient disease or defect, followed by suitable advice; (2) health education directed to the development of good health habits; (3) supervision of conditions of work; and (4) provision of emergency treatment facilities—to which has been added (5) rehabilitation.

'These ideas may be reflected in the proper use of the pre-placement examination, the periodic examination, advice on health problems, health education, bettering the conditions of work, and rehabilitation.

'The qualified industrial physician, irrespective of his official professional character, has long since realized that the opportunity for useful health supervision is made available only by a high standard of clinical medicine, proved neutrality and normal physician-patient relationships. Management-dominated or labor-dominated medicine has no place in industry if health supervision is the objective. To maintain this neutrality line authority must be avoided and advice given only in relation to professional training and experience. This is a sacred trust.

'In its brief span, industrial medicine has made great strides. Health services are now available to large numbers of workers. Industry is looking to the medical profession for leadership in the field of health maintenance. To meet this challenge important opportunities lie in the direction of still closer coordination of clinical and industrial health services at the teaching and at the practice level. The responsibility for further progress in this direction does not rest entirely with the physician in industry.'

IN THE Section of Urology, DRS. E. L. MORGAN, J. P. WYATT, and R. B. SUTHERLAND, of Toronto, presented a paper on "An Episode of Carbon Tetrachloride Poisoning with Renal Complications," giving two case histories somewhat in detail.

The exposure has reference to the work of 10 men exposed to the vapors of carbon tetrachloride used in a degreasing operation.

Two case histories are given in detail:

The first is that of a 42-year old male who complained of nausea and vomiting, epigastric pain, constipation, backache and headache beginning December 27, being first seen on January 2; an oliguria began December 29—the latter progressed to a point where he passed only a fraction of an ounce of urine daily.

The patient admitted drinking his share of a 26-ounce bottle of whiskey on Christmas Eve and four to five bottles of beer on Christmas, and the first impression was that he had a urinary retention from the use of alcohol.

Admitted to the hospital on January 4 with the diagnosis of anuric uremia, the cause to be determined. His blood non-protein nitrogen on admission was found to be 177 mgs. percent and the carbon dioxide combining power 38.1 volumes percent. He showed an inability to concentrate his urine. The urine continued to show a trace of albumin, but the cellular constituents had increased to 150 to 200 red blood cells and to 35 to 40 plus cells per high power field. He was given 2800 cc. of sodium lactate solution on January 6, to control his acidosis and to encourage diuresis. Following this, however, the patient displayed gross edema of ankles, face and hands, and became somewhat irrational.

From the time of his admission, he began to put out increasing amounts of urine, and on January 10 he voided an unexpectedly large amount of 2050 cc. However, the non-protein nitrogen continued to rise to a high of 199 mgs. percent and his blood creatinine reached a peak of 20.5 mgs. percent on January 13, after which, however, both began to fall. The edema disappeared as did the nausea and vomiting and the patient took on a sense of well-being with his increase in urinary output.

Until January 13, no explanation was forthcoming as a cause of this man's illness except that the biochemist, while previously attempting to do a van den Bergh test, repeatedly encountered an interfering substance which in his experience was usually the result of sulphonamide therapy.

On learning that a fellow employee had been admitted to another hospital in the city with oliguria and pulmonary edema said to be due to exposure to carbon tetrachloride, the patient vividly recalled a three to four hour exposure to a vapor from this substance while it was being used to clean a conveyor belt some 25 feet from him the day after Christmas. Other details of his exposure were also recalled.

Subsequently kidney function tests were done, the first showing only 11% elimination of the dye at the end of two hours, increasing however to 31% later, and within normal limits by several weeks, with a 73% elimination.

Repeated van den Bergh, Hanger flocculation and bromsulphthalein tests of liver function showed no evidence of damage. However, a hippuric acid from the sodium benzoate ingested as compared with the accepted normal of 85 to 110% synthesis. From this, it was postulated that the liver had not come through the exposure entirely undamaged.

When discharged from the hospital February 14, the patient was feeling perfectly well and had apparently made a complete recovery from an acute toxic nephrosis due to carbon tetrachloride.

In the second case, a 39 year old male had been in charge of the degreasing operation and had been exposed every three to four weeks to the vapors of carbon tetrachloride for approximately 16 months previous to the massive exposure occurring on December 26. He was known by habit to frequent the

beverage rooms but we can only speculate as to the amount of drinking done over the holidays.

On December 28 he first complained of severe nausea, vomiting, backache and headache, but continued to work off and on, feeling very weak and tired and constantly nauseated. Suddenly, on January 8, 1948, he developed marked shortness of breath and had a convulsive attack. At this time he was seen by his family doctor who admitted him to the hospital.

The urine on admission showed specific gravity 1.012, acid reaction, and slight albuminuria, and a few white blood cells. Hemoglobin was 69%, red cell count 3,600,000, white cell count 10,200. The day following, the blood non-protein nitrogen reading was 173 mgs. percent; a fasting blood sugar was 137 mgs. per 100 cc.

For the first three days in the hospital, the patient was treated as a case of chronic nephritis until the history of exposure was clarified. On January 10, oliguria became a marked feature and the next day the patient developed gross edema of the lungs, marked dyspnea, and subsequent cyanosis. There was no evidence of pendant edema or jaundice, and neither liver nor spleen could be palpated. Blood pressure at this time was 136/80. Laboratory examination on January 13 revealed an icteric index of 8 units, negative van den Bergh and negative urine tests for bilirubin and urobilin. The non-protein nitrogen in the blood had risen to 213 mgs. percent. On January 12 the temperature, pulse, and respiration became elevated to 101, 110 and 36 respectively, and remained thus until the patient's death on January 13. Death was attributed to acute pulmonary edema, probably secondary to the uremia.

At autopsy, the following conditions were found: intense edema of the lungs associated with bilateral hydrothorax; lower nephron type of nephrosis; disseminated central necrosis of the liver; edema of the brain with tentorial and cerebellar coning; mucosal injection of the duodenojejunal junction and an acute dilatation of the stomach.

In the discussion, interest is emphasized in the variation in response shown by the individuals exposed. The reason for the serious poisoning sustained by the patient in the second case history is not entirely apparent. The most plausible explanation is that he worked in a high local concentration, an eddy created by the position of the "warm room" in relation to draughts from the windows. This possibility is given some support by the statement made by the men who worked on either side of him that the odor of the solvent was very strong in their vicinity. The remaining three men, some 5 feet to the left, denied noticing any odor.

Another point worthy of consideration is that the episode occurred just after Christmas, a time of celebration. Of the men most seriously affected, one admitted to the drinking of alcoholic beverages during the two days preceding the exposure. The other, who later died, was reported to be a fairly regular consumer of beer. Though one cannot conclude that consumption of alcohol enhances the toxicity of the chlorinated hydrocarbon, the frequency with which a history of the ingestion of alcohol has been noted in cases of serious carbon tetrachloride poisoning causes one to wonder if this fact may not be significant.

The fatal case illustrates the difficulty that the general practitioner may encounter in obtaining a history of exposure to carbon tetrachloride or other potentially toxic materials. The first patient knew the offending substance by name, knew too that in high concentrations it might make one "dopey" and even "sick at the stomach." He was subconsciously reassured, however, by the fact that it had been used frequently in the past without apparent ill effects. For over two weeks after the hospitalization, he did not associate his illness with his exposure to carbon tetrachloride. Even after being told by his doctors that he had been poisoned, the source and the substance remained a mystery. It was not until the appearance of the second case of carbon tetrachloride poisoning and the patient was questioned directly that a history of exposure was obtained.

Several important features should be stressed in the fatal case of carbon tetrachloride poisoning. The early widespread central necrosis of the liver represents the effect of the carbon tetrachloride upon the absorptive central zone of the lobule. The phenomenon as indicated by Himsworth and Glynn is that there is initially a parenchymal swelling in this region with a compression of the liver sinusoids ultimately resulting in a necrosis of the central zone. The second interesting feature is the presence of a lower nephron nephrosis. The term "lower nephron nephrosis" has been introduced by Baldvin Lucke and is synonymous with the terms "kidney of traumatic uremia," "tubulovascular syndrome," "kidney of crush syndrome," and "hemoglobinuric nephrosis" of Mallory.

W. W. Woods was probably the first to draw attention to three fatal cases of carbon tetrachloride poisoning showing lower nephron nephrosis. In reviewing Hans Smetana's article, there were a number of cases of carbon tetrachloride poisoning which, likewise, showed a high incidence of pigment nephropathy, although Smetana did not strictly label this group as lower nephron nephrosis as Lucke and W. W. Woods have done.

The third interesting feature was the presence in the lungs of incarcerated globules of fat in the regions of interstitial fibrosis. Could it be possible that these streaks of fibrous tissue represent a reparative reaction to an antecedent liberation of embolic fat fragments in the pulmonary capillaries resulting from previous minimal exposures while carrying out degreasing operations?

In conclusion, it should be pointed out that exposure to vapors of carbon tetrachloride is fairly common and many cases of poisoning have been reported in the literature, that probably many subclinical and unrecognized cases occur, that individual susceptibility varies and is probably enhanced by the use of alcohol, and that where massive exposure has occurred renal involvement is frequent and pronounced and may dominate the picture.

The Care of Hand Injuries
—Requirements of Early Definitive Treatment—

THE first aid treatment of hand injuries is directed fundamentally at protection. It should provide protection from infection, from added injury, and from future disability and deformity.

This protection is afforded by non-interference with the wound, cleanliness of surrounding areas, the application of sterile protective dressings and immobilization in the position of function.

The general requirements for proper early definitive care are:

THOROUGH EVALUATION OF THE INJURY:

1. Determination of the time, place, causative agent and mechanism of the injury.
2. Determination of the nature and extent of the first treatment given.
3. Determination of infection status; whether the wound is relatively clean, grossly contaminated or with infection established.
4. General nature of the wound; i.e., contusion, abrasion, burn, incised wound, lacerated wound, crushing wound, puncture wound, tooth wound, imbedded foreign body, fracture, compound fracture, amputation or combined injuries.
5. Evaluation of structural damage:
   (a) Degree and extent of surface injury.
   (b) Source of major bleeding.
   (c) Evidence of tendon or muscle damage by testing function *against resistance.*
   (d) Evidence of nerve injury elicited by testing for motor and *sensory* functions.
   (e) Bone and joint injury determined by x-ray.
   (f) Discovery and exact localization by x-ray of suspected opaque foreign bodies.

ADEQUATE FACILITIES AND EQUIPMENT:

1. Each hospital or clinic should have at least one surgeon who is thoroughly familiar with the anatomy and physiology of the hand and who is prepared to undertake the early treatment of its major injuries.
2. Such treatment should be rendered under strictly aseptic conditions, preferably in an operating room, with careful adherence to aseptic technic in the matter of scrubbing, draping, masking and the use of gloves.
3. An adequate supply of appropriate instruments.
4. Sufficient assistance to assure good exposure.
5. Good lighting.
6. Provision of a bloodless field by means of pneumatic tourniquet or blood pressure cuff.
7. Complete anesthesia for the patient, preferably by general anesthetic.

APPLICATION OF APPROPRIATE TREATMENT:

1. Thorough cleansing of a wide area around the wound with the wound protected. (Entire hand and forearm.) Shaving, soap and water scrub.
2. Thorough cleansing of the immediate wound area, preferably with soap and water or a bland detergent. Antiseptics should not be used in or on the wound.
3. Careful inspection of the wound and assurance of adequate exposure, by additional incision if necessary, *closely paralleling natural creases.*
4. Thorough toilet of the wound, removing, under inspection, all foreign matter. Excision, by sharp and careful dissection, of all completely devitalized or grossly soiled tissue in the wound surfaces. It is essential that the greatest care be exercised to spare all tissues that may be viable, particularly skin, tendon, nerve and bone fragments.
5. Assurance of hemostasis by ligation of major injured vessels.
6. Repair of injured nerves by end-to-end union with fine interrupted perineural sutures. The uniting of divided digital nerves is important to future function.
7. Repair of other soft tissue injuries, where appropriate; i.e., in clean wounds of short duration, in well-cleaned contaminated wounds of not over eight hours' duration, never in wounds with established infection.
8. Reduction of fractures and dislocations, and retention in corrected position by traction or splinting in the position of function (position of grasp with wrist in dorsiflexion).
9. Application of protective dressing, fingers separated by gauze and hand immobilized to such extent as may be necessary to permit healing, in the position of function (never in the flat position).
10. Administration of antibiotics and protective antitoxin as indicated.

AFTER-TREATMENT:

1. Elevation and rest of the hand.
2. Non-interference with initial dressing for a sufficient time to permit healing, unless evidences of suppuration develop.
3. Restoration of skin coverage of denuded areas at earliest possible time. Partial thickness skin grafting is a simple and valuable means of promoting early healing.
4. Early restoration of function for non-affected parts of the hand by directed *active* motion to the fullest extent that will not jeopardize healing of repaired structures.
5. Restoration of function in affected parts of the hand by directed *active* motion as early as is consistent with full healing and preservation of the repair of damaged structures.

Prepared by the American Society for Surgery of the Hand, October, 1948.

ASSOCIATION NEWS

Meeting of the Board of Directors

ON SUNDAY, January 16, 1949, PRESIDENT VONACHEN called the Board of Directors to order, with 13 out of 17 Officers and Directors present. Several preliminary committee meetings had been held in the Association offices, with the earliest arrivals from Detroit at 8:30 Sunday morning. In addition to the Officers and Directors, there were present District Counsellor, H. GLENN GARDINER; Chairman, C. RICHARD WALMER, of the Health Achievement Award in Industry committee; Past-President DANIEL L. LYNCH, now Chairman of the Meritorious Award Committee; and CHARLES E. DUTCHESS, Chairman of the Public Relations Committee. MR. STEPHEN G. HALOS, Director of Exhibits, presented his report on the progress of our Detroit Convention exhibits; and MRS. GLADYS DUNDORE dropped in during the afternoon to discuss problems and progress in connection with the Detroit program for the nurses. The various reports were most interesting, and considerable time was spent discussing the contemplated changes in By-Laws suggested by the Membership Committee that are to be considered by the Annual Meeting in Detroit.

This was the first appearance of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEON' Directory—copies being presented to the Officers and Directors. The remaining 2,065 copies are being mailed directly from the printer to every member of the Association. There may possibly be some errors in the alphabetical and geographical listing, and the home office will appreciate being informed of any such errors so that the Directory cards and data can be kept correct up to the minute. It is hoped that the listing of Past-Presidents, dates and places of the Annual Meetings, and other data about the membership will interest all the members. One of the real advantages will be the possibility of checking the geographical index to see who your neighbor Association members actually are and where they are located. In addition, while looking over this geographical listing there will be a splendid chance for you to observe the missing names of other industrial physicians and surgeons who should be members of this Association. Why not drop us a post card with their names and addresses and let us send them an application with a personalized letter and information suggesting membership?

DR. WHITTAKER gave a most encouraging report on the plans for the Annual Detroit Meeting. The preliminary programs will be mailed before February 10. There are excellent clinics, and most instructive papers and presentations and many plant visits and tours.

The business of the Board of Directors was completed in the late afternoon, and nearly all remained for the Fellowship Hour at the Drake and a most delightful dinner and evening at the South Shore Country Club.

Proposed Changes in the By-Laws

THE proposed changes in the By-Laws of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS are published herewith so that they can be given due consideration at the Annual Meeting to be held in the Book-Cadillac Hotel Ballroom, Detroit, Thursday afternoon, 4:30 P.M., April 7, 1949:

Present by-laws read: "Section 2. Fellow Membership. Fellows shall be elected from persons who have been Active and/or Associate Members for at least five (5) consecutive years prior to their election as Fellows."

We propose that Section 2 be changed to read as follows: "Section 2. Fellow Membership. Fellows shall be elected from persons who are Active Members and have been actively engaged in the practice of industrial medicine for at least five (5) years prior to their election as Fellows.

(a) At least once a year, the District Counsellors with the assistance of the officers of the respective component societies, shall review the roll of Active Members and make recommendations for Fellowship.

(b) Fellowship shall be conferred by the Board of Directors upon those Active Members who have been properly indorsed by the Counsellor and approved by the Board of Examiners.

(c) The Board of Examiners shall consist of three (3) Fellows appointed by the President; the appointment must be approved by the Board of Directors. The term of office of the Examiners shall be for a period of three (3) years with not more than one new appointee each year.

(d) Requirements for Fellowship. Except for the five (5) year requirement, the additional requirements shall rest with the Board of Examiners.

(e) The Active Members recommended for Fellowship shall appear before the Examining Board at a time and place specified by the Board in order that proper recommendations may be made to the Board of Directors at a regularly scheduled meeting. This requirement may be waived under special circumstances.

(f) A suitable certificate will be issued by the secretary to those upon whom Fellowship has been conferred. The Board of Examiners shall be authorized to make available other desirable insignia of Fellowship.

In the present by-laws, Section 3 reads as follows: "Section 3. Active Membership. Active Members shall be persons who are in good standing in the American Medical Association through the respective local county medical societies, or, where the applicant resides in a foreign country, of some corresponding association or society, and who shall have had at least five (5) years' experience in the practice of medicine or surgery since graduation from internship, at least three (3) of which must have been in the field of Industrial Medicine and Surgery, during which three-year period, 50 per cent of his practice must have been in that specialty, provided that a person with exceptional qualifications and experience, even though less than 50 per cent of his practice is industrial, may become an Active Member."

We propose this Section to be changed to read as follows: "Section 3. Active Membership. Active Members shall be persons who are in good standing in the American Medical Association as Active Members, Associate Members, or Service Fellows (Medical Officers on active duty in the U. S. Army, U. S. Navy, or the U. S. Public Health Service); or, where the applicant resides in a foreign country, of some corresponding association or society, and who shall have had at least five (5) years' experience in the

practice of medicine or surgery since graduation from internship, and actively engaged in the practice of Industrial Medicine or Surgery, and/or engaged in the investigation of Industrial Medical Problems for at least three (3) years."

In the present by-laws, Section 4 reads as follows: "Section 4. Associate Membership. Associate Members shall be persons who have the personal and professional qualifications for Active Membership but whose length of experience in the practice of medicine or surgery or whose percentage of industrial practice is insufficient for such membership."

We propose this Section to be changed to read as follows: "Section 4. Associate Membership. Associate Members shall be persons who have the personal and professional qualifications for Active Membership but whose length of experience in the practice of medicine or surgery, or in the field of Industrial Medicine or Surgery is not sufficient for such membership. It may also include specialists in other branches of medical practice who have an interest in Industrial Medicine or Surgery but are not actively engaged in this specialty."

Dr. Franco

DR. S. CHARLES FRANCO was appointed Assistant Medical Director for the Consolidated Edison Company of New York, Inc., in January, 1949. He has been associated with the Medical Department since 1935, on a part-time basis, as a consultant in the Diagnostic Clinic. He will help handle the growing administrative and clinical work of the Department at 4 Irving Place, New York. DR. FRANCO'S pre-medical work was done at Columbia University and he was graduated from the Long Island College of Medicine in 1931. He served his internship and residency in internal medicine at the Long Island College Hospital, 1931-1934. He has been in the practice of internal medicine in Brooklyn since 1935 and has been affiliated with the Long Island College of Medicine, being appointed Assistant Professor of Clinical Medicine in 1946. His hospital appointments include the Long Island College Hospital and the Kings County Hospital where he has been Associate Attending Physician. Entering on active Military Duty in 1942, he was appointed Executive Officer of the 79th General Hospital, affiliated units of the Long Island College of Medicine, and was promoted to Lieutenant-Colonel in April, 1943. In the E.T.O. he was Commanding Officer of the 9th Field Hospital and participated in the five major campaigns in Northern Europe. His unit was awarded a Meritorious Service Unit Plaque and he received the Bronze Star Medal. After the cessation of hostilities he became chief of the medical service of the 28th General Hospital, and was discharged September, 1945, after two years of overseas duty. DR. FRANCO is a Diplomate of the American Board of Internal Medicine and of Gastroenterology, Fellow of the American College of Physicians, and a member of the Brooklyn Society of Internal Medicine, New York Gastroenterological Association and the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS.

Past-Presidents' Committee

THE following represents a progress report on the work of the Past-Presidents' Committee to date:

The Past-Presidents have been informed of important transactions at Board of Directors' meetings from time to time, and it is contemplated to submit a report of the transactions of this coming meeting of January 16, at which time an invitation will be extended to the Past-Presidents' Luncheon at the Annual Convention in April. Plans for this are progressing and the detailed announcement of the entire program will shortly be rendered.

I am happy to report that PAST-PRESIDENT LYNCH has obtained some much needed rest after his release from active duty with the New England Telephone Company, and while he remains and always will remain a very busy individual, the release from his tremendous responsibility there has undoubtedly been a boon to him. He is now interested in his work with the Meritorious Award Committee.

—HENRY S. BROWN, M.D., Chairman.

Workmen's Compensation and Insurance

NO MEETINGS of the committee have been held, although there has been correspondence by the chairman with the individual members.

The past year has not seen any notable accomplishments except for (1) extension of coverage for occupational disease in several states, and (2) enactment of W.C. legislation by Mississippi, thereby providing occupational injury coverage in all of the 48 states.

The previous reports of the committee cover most points of weakness in the administration of our W.C. laws and what should be done about them. In general, most of the discussion has revolved about technical matters of coverage and administration. Much educational work has to be done to promote higher standards among the legislators, the members of the W.C. boards and the physicians practicing workmen's compensation medicine.

It has been brought out that administration would be more equitable and efficient if the medical profession could arrive at more common ground for acceptable criteria for diagnosis and evaluation of compensable disabilities than is the case at present.

Although the underlying philosophy of our W.C. legislation has almost universal acceptance, nevertheless, there is much thought going on towards providing a different approach in order that (1) there may be a more equitable system of compensation for disabilities resulting from occupational injury or disease, and (2) there may be inserted into our W.C. structure an "incentive system" for rehabilitation—something which is lacking in the present structures.

The Chairman of this Committee feels that the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS should be represented at the meetings of the International Association of Industrial Accident Boards and Commissions. Through the efforts of DR. NALE, a paper is being prepared on compensation medicine which will be ready sometime within the next month.

The author of the paper is DR. IRVING GRAY, of Brooklyn, with the collaboration of H. D. SAYER (General Manager of the New York Compensation Insurance Rating Board), DR. HARRY SPALDING and DR. EDGAR MAYER. We feel sure that this study will arouse constructive thought on the subject.

—CARL T. OLSON, M.D., Chairman.

LETTERS

That "Nine Billion"

TO THE EDITOR: My attention has been called to the quotation from the *Rocky Mountain Medical Journal* which appeared in the November, 1948, issue of INDUSTRIAL MEDICINE, which is captioned "Puzzle! Where is the $9,000,000,000?" and your editorial which is captioned "Where is the Nine Billion?" I think the answers to your question will be found in the Report of the Advisory Council on Social Security which was appointed by the Committee on Finance of the United States Senate under authority of Senate Resolution 141 introduced by the distinguished Senator from Colorado, Senator Millikin. Therefore, I am enclosing a copy of that Report and refer you to Appendix A, "The Old-Age and Survivors Insurance Trust Fund," which I am sure you will want to publish in full because of the question which apparently has existed in your mind and which you have now raised in the minds of all your readers.

—A. J. ALTMEYER, Commissioner,
Social Security Administration,
Federal Security Agency

APPENDIX A. The Old-Age and Survivors Insurance Trust Fund: As stated in its recommendations, the Council does not favor a full reserve plan sufficient to cover all liabilities. Under a contributory system of old-age and survivors insurance, however, qualifying requirements—even though liberal—unavoidably result in lower benefit disbursements in the early years of operation than in the later years. If contributions in the early years were no more than sufficient to cover disbursements, they would be so small in relation to benefit rights currently being established that the system could scarcely be called contributory. For example, on a strictly current-cost basis, contribution rates at present could not be set above 0.3 of 1 per cent of payroll for employers and 0.3 of 1 per cent of payroll for employees. The contributory nature of the system, therefore, inevitably develops at least a limited reserve. This reserve has been invested in United States Government securities, which, in the opinion of the Council, represent the proper form of investment for these funds. We do not agree with those who criticize this form of investment on the ground that the government spends for general purposes the money received from the sale of securities to that fund. Actually such investment is as reasonable and proper as is the investment by life-insurance companies of their own reserve funds in government securities. The fact that the government uses the proceeds received from the sales of securities to pay the costs of the war and its other expenses is entirely legitimate. It no more implies mishandling of moneys received from the sale of securities to the trust fund than it does of the moneys received from the sale of United States securities to life-insurance companies, banks, or individuals. The investment of the old-age and survivors· insurance funds in government securities does not mean that people have been or will be taxed twice for the same benefits, as has been charged. The following example illustrates this point: Suppose some year in the future the outgo under the old-age and survivors insurance system should exceed payroll tax receipts by $100,000,000. If there were then $5,000,000,000 of United States 2% bonds in the trust fund, they would produce interest amounting to $100,000,000 a year. This interest would, of course, have to be raised by taxation. But suppose there were no bonds in the trust fund. In that event, $100,000,000 to cover the deficit in the old-age and survivors insurance system would have to be raised by taxation; and, in addition, another $100,000,000 would have to be raised by taxation to pay interest on $5,000,000,000 of government bonds owned by someone else. The bonds would be in other hands, because if the government had not been able to borrow from the Old-Age and Survivors Insurance Trust Fund, it would have to borrow the same amount from other sources. In other words, the ownership of the $5,000,000,000 in bonds by the old-age and survivors insurance system would prevent the $100,000,000 from having to be raised twice—quite the opposite from the "double taxation" that has been charged. Under present conditions the government is operating with a budget surplus and is not borrowing. The trustees of the Old-Age and Survivors Insurance Trust Fund, therefore, when they invest the excess income in government securities, in effect cause government debt to be transferred from private ownership to the Old-Age and Survivors Insurance Trust Fund. The same saving of the amount of the interest for the general taxpayer will occur in this instance as in the one described above. The members of the Advisory Council are in unanimous agreement with the statement of the Advisory Council of 1938 to the effect that the present provisions regarding the investment of the moneys in the Old-Age and Survivors Insurance Trust Fund do not involve any misuse of these moneys or endanger the safety of the funds.

From Stockholm

TO THE EDITOR: Here in Sweden (on what is equivalent to a national scale for us in the U.S.A.), the government, Employers Association, and labor unions have each provided their share of funds to establish a Labor Research Institute in the Royal Technical University of Stockholm. This was done expressly to make my work here possible. I am the only worker in the Institute. It is governed by a small board of directors: Professor Robert Kristensson of the University is Chairman, with one man from government, one from management, and one from labor. Actually, I am cut free from all red-tape, have academic freedom, and things are largely between Professor Kristensson and myself. Kristensson is an economist and labor relations expert of international standing. He lectures each year at M.I.T., etc. In addition, he is most personable.

Next Monday, I start a two-week's training course in job analysis with particular reference to physical demands analysis work. The class will consist of about 15 persons: three will work in this field permanently (going from plant to plant), while the others will just take the basic training. This latter group will be made up of men from management, labor, medicine, safety, personnel, various firms, etc. The course will be completed on December 24, and then will come Christmas vacation (very long here) until January 10.

On January 10, we will start our work in industry. We are to study three important plants: (1) an electrical parts plant of about 5,000 workers, (2) an aircraft plant of about 2000 workers, and (3) a

highly mechanized leather and shoe factory of about 600 workers. In each of these, we are to analyze all the jobs and set up placement programs, that is, programs which allow each worker to be placed according to his physical and environmental capacities. This will, of course, make it possible to utilize many more disabled persons than formerly.

We hope to complete this work and have the programs under way in each plant in three months. During the next three months, we will follow the programs closely and obtain the results of our work. After this will come numerous lectures on the results to various special groups, such as, medicine, personnel, safety, union leaders, management groups, engineers, students, etc. It is also expected that I will then be able to give lectures and training for two weeks each in Norway and Denmark.

During this time, and particularly during the second three-months period, I will also be busy working on the completion of my book, "Human Capacities and Work." While it is not definite now, it is possible that I will be able to stay on a few months longer and complete my book here. If not, I will complete it in Berkeley; but it will be published here, first in English, and second in Swedish. The Labor Research Institute is to publish and distribute the book internationally. Also, we are hoping to build this Institute into a permanent thing that will undertake other labor research problems. I should add, too, that after we finish analyzing the three plants above, the permanent staff of three is to go on to analyze other plants with me acting only as a consultant from time to time.

I am deeply delighted with the work and its prospects. As they unfold, I shall write you further.

—BERT HANMAN.

BOOKS

Disability Evaluation

DISABILITY Evaluation—Principles of Treatment of Compensable Injuries, by Earl D. McBride, B.S., M.D., F.A.C.S., Assistant Professor in Orthopedic Surgery, University of Oklahoma School of Medicine, Oklahoma City, Oklahoma. Cloth. 667 Pages with over 400 Illustrations. J. B. Lippincott Company, Philadelphia, Pennsylvania, 1948.

THIS is the 4th edition of a book which has become recognized as being authoritative in its field. It is a valuable reference work for physicians engaged in industrial medical practice, compensation claim departments of insurance companies, members of workmen's compensation boards, lawyers, industrial nurses, and physicians in other branches of medical practice who wish information concerning this subject. Its 36 chapters include a discussion of the doctor as an expert witness, workmen's compensation laws, procedures used in evaluating disability, followed by a detailed description of injuries and disability evaluation subdivided on an anatomical basis. The basic functional method of determining disability is described by the author including a 23-page composite schedule of representative disability and graded ratings. The printing is good, the wording is concise, and the subject matter is subdivided into paragraphs whose contents are described by a title in heavy print; these features, together with the numerous illustrations, diagrams and tables render the valuable contents of this book readily acceptable for reference.

Relative to the relationship of the employer and the disabled workman, the following quotation is significant: "He (the employer) assumes the attitude that because he is paying for insurance, the carrier should shoulder all responsibility. Consequently, it often occurs that the injured person who has recently recovered is refused work unless he can start in at once at normal capacity. Following recovery from the immediate effects of a serious injury, there is usually a period in which weakness, soreness and stiffness can be overcome only by gradual return to activity. A useful occupation in which the mind is diverted from the effects of an injury is extremely beneficial in the process of rehabilitation." In defining accidents, the author states that, "The physiologic lesion or damage sustained by the workman in the course of the employment, if its origin is contributed to in the slightest degree, by some ordinary effort of the employment, constitutes an accident." Also, "The actual aggravation of an existing infirmity caused by accident in the course of employment is compensable even though the accident would have caused no injury to a normal person."

In connection with the need for more uniformity in the compensation laws of various states, the author discusses the suggested remedial provisions advocated by a committee of the International Association of Industrial Accident Boards and Commissions. Also included is a table of permanent partial disability schedules stated in percentages of permanent total disability according to ages; other tables list the relative values of specified injuries in percentages of permanent partial disability, the schedules for specific loss of various anatomical parts listed by states, and a similar schedule according to states based on percentages of permanent total disability for these same specific loss injuries. The author frankly admits that no way has yet been devised whereby evaluation of permanent partial disabilities may be standardized.

In addition to the usual factors included in evaluating disability, other often overlooked but important features include vocational loss, anatomic loss, earning capacity and functional ability. Disregard of the composite picture is one cause for the discrepancy which so often develops between the interpretation made by two different examining physicians.

Rather more space than one might expect is devoted to a discussion of specific injuries and their treatment; however, this is understandable because disability evaluation must rest on an understanding of both the normal and pathologic conditions. Particularly valuable are the methods used to describe the technique of diagnosing and measuring the deviations from the normal; helpful diagrams portray this very effectively. And there is a 20-page table listing virtually all known occupations with code numbers representing parts of the body which may be disabled and the person still being able to work at the designated job.

The troublesome problem of disability evaluation is ever existent. To all those who are confronted with it, this book is a practical necessity.

—FREDERICK W. SLOBE, M.D.

INDUSTRIAL MEDICINE

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The Detroit Program

DR. HOLMBLAD advises that the Program for the Detroit Conference, April 2-9, will have been distributed by the time this Journal reaches its readers. This is an imposing program. In addition to the usual features such as the Medical-Surgical Clinics at Harper Hospital and Henry Ford Hospital on Tuesday, April 5, there are to be four Sectional Meetings: for physicians in general manufacturing, in steel and heavy industries, in rubber, petroleum and chemicals, and in mining. Then, too, for the first time at a convention of these groups, there are Association-sponsored field trips to industrial plants: Parke-Davis, Plymouth Motor Car Division—Chrysler, Cadillac Motor Car Division—General Motors, and Ford Motor Car Company, and special visits to any of a dozen other plants and medical departments. The subjects of the papers and symposiums are timely and important; for example, Wednesday has a morning session on cardiovascular diseases in business and industry, and an afternoon session on the problems created by atomic radiation, and Wednesday evening is given over to "Alcoholism in Industry." But the program itself is the best evidence; read it, and make reservations!

Thackrah as a Pioneer

IN THE tributes to CHARLES TURNER THACKRAH elsewhere in these pages, PROFESSOR LANE quotes from THACKRAH'S preface to the second edition of his book, published in 1832, as follows: "If any object that the *cure*, not the cause or prevention of disease, is the business of the medical practitioner, I would reply that the scientific treatment of a malady requires a knowledge of its nature, and the nature is but imperfectly understood without a knowledge of the cause." PROFESSOR LANE goes on to say that "THACKRAH was a great pioneer in preventive medicine." He said this with reason, for THACKRAH'S statement above quoted is a sort of Golden Text of etiology. And THACKRAH'S place in history as also a great pioneer in industrial medicine stems from his instinctive appreciation of the tremendous importance of the etiology in every diagnosis of an industrially-caused or an industrially-discovered malady. Single emphasis on cure reminds of the story of the bridge-tender who, instead of putting a board over the hole in the walk above the water, made it his business to row out in a skiff and rescue the unfortunates who fell in. THACKRAH'S whole approach to industrial medicine—"it is difficult to find a page in this (his) book which does not foreshadow future developments in industrial medicine"—was a clear picture of the modern concept which DR. ROBERT C. PAGE is so fond of calling "constructive medicine," the kind of medicine that has its finest expression in present-day examples of medicine in industry.

Specious Argument

AN INTERESTING broadcast, "Should We Adopt Federal Health Insurance?" (WMAQ), on Sunday, January 23, emphasized the speciousness of some of the arguments in favor of a Federal health plan. One of the participants, a labor union economist, told of the plight of the hypothetical wage earner who experienced vague symptoms which he feared might indicate something serious the matter with him, and had to choose between the expense of a physical examination or using the money to send his daughter to college. Aside from the obvious disparity of these as alternatives, it would have been a very good rebuttal to remind this economist that a vast number of wage earners work in plants where there are employee medical services, and that any such wage earner can go to his company physician at any time and get a complete physical examination at no cost to himself. This, indeed, is so true, that one of the best forms of health insurance in existence today is employment in a plant where there is a company medical department—for industry's chief interest is *health*, and it is spending tens of millions to insure it.

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NEWS, COMMENT, OPINION

DR. BEN FREES, veteran industrial physician and surgeon, took office as President of the Los Angeles County Medical Association January 1. Formerly president of the WESTERN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, DR. FREES is chief surgeon for many Southern California industries, including the *Los Angeles Examiner*. He was born in California, is a 1914 graduate of the University of California, and has practiced medicine in Los Angeles since 1916 with the exception of the World War I years when he then served as a First Lieutenant in the Medical Corps, United States Army.

—From *Los Angeles Examiner*, December 7, 1948.

DR. RALPH C. ROBERTS has been appointed Medical Counselor at the *Chicago Tribune*, according to DR. THEODORE R. VAN DELLEN, *Tribune* Medical Director. His duties will consist of examining, treating, and giving medical advice to some 4300 employees. He replaces DR. JOHN MART, who will devote his time to private practice. DR. ROBERTS has a private practice in Evanston and Chicago, and is a member of the Wesley Memorial hospital staff and of the faculty of the Northwestern university medical school, both in Chicago. After being graduated from the Northwestern medical school, he interned at Wesley hospital, was awarded a Northwestern medical school fellowship, and spent two years in research and teaching. The following year he was chief medical resident at Evanston hospital. During the war he served three years with the army in North Africa and Italy.

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Colorado Committee

THE Committee on Industrial Health reviewed state Occupational Disease Law, laid ground-work for legislation to correct inadequacies developed preliminary draft for survey of incidence and severity of occupational disease in Colorado, took part in the A.M.A. Regional Conference on Industrial Health May 20, 1948, arranged jointly with the Medical School for annual refresher course in industrial medicine, and offered following recommendations: (1) Accelerated work on proposed improvements of the Colorado Occupational Disease Law so that a positive stand may be presented prior to the convening of the 1949 Legislature. (2) Continued work on the 1947 recommendations. (3) An adoption of the principle of fostering ethically compatible cooperative plans with any group that will aid in the prevention or enhance the care of occupational injuries or disease in Colorado.

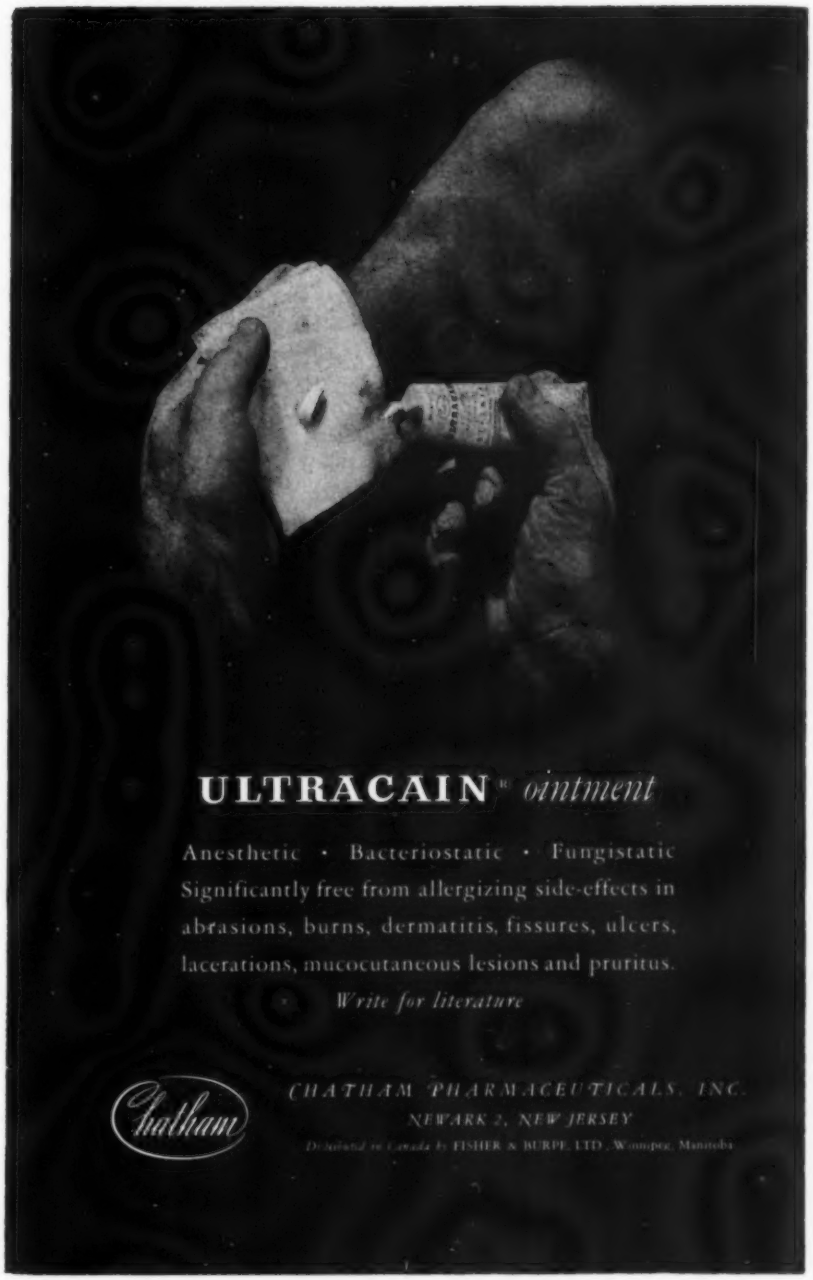
—*Rocky Mountain Medical Journal*, December, 1948.

New Theory

TWO MILWAUKEE doctors are trying to prove a theory that electricity in the body is one of the causes of disease. Should this revolutionary idea be proved it might some day bring a revision in the diagnosis, treatment and prevention of some ailments. DR. SILAS M. EVANS, 38 years old,

practicing physician and assistant professor of clinical medicine at the Marquette University Medical School and DR. WALTER ZEIT, head of Marquette's Department of Anatomy, already have produced silicosis in rats by applying the new hypothesis. Such a development is so radically new that Marquette, the Allis-Chalmers Manufacturing Company and the Globe Steel Tubes Company, Milwaukee, and the Bell Telephone Company laboratories at Surprise Lake, New Jersey, have lent their experts and facilities to further it. The theory that electrical discharges set up in the body may be the real cause of some inflammatory diseases would contradict the long-accepted idea that chemical action causes these diseases. It may unravel mysteries that still baffle doctors. DR. EVANS, working from the outset with DR. ZEIT, has demonstrated that silicosis—a lung ailment suffered by persons who breathe mineral dusts—probably is caused when silica crystals pulled into the lungs give off a low-grade alternating current each time lung tissue presses on them. The electrical action starts the formation of scar tissue and keeps it growing. Eminent chest specialists and other researchers have come here to investigate and have been impressed; some have started studies of their own based on the experiments here.

—*New York Times*, December 5, 1948.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Alcohol Studies

THE Summer School of Alcohol Studies, conducted annually since 1943 by the Laboratory of Applied Physiology of Yale University, will hold two separate but equivalent sessions this year. A Western session will be held from June 6 to June 29 on the campus of Trinity University at San Antonio, Texas, and an Eastern session will be held at Yale University in New Haven, Connecticut from July 8 to August 5. The aim in holding two sessions is to make possible the accommodation of more students during the current year and at the same time to render attendance more convenient to students residing at great distances from New Haven. The curriculum, consisting of lectures, seminars and demonstrations, deals with the medical, psychological, physiological, psychiatric, sociological, economic, legal, religious, educational and therapeutic aspects of alcohol problems. During the second half of each session the curriculum is divided up into two parts for the professional groups concerned particularly with the educational or the therapeutic aspects of alcoholism. The first half of each session is the same for all students. The summer school is under the directorship of PROFESSOR E. M. JELLINEK. The lecturers, mainly from the faculties of Yale University and Texas Christian University, include authorities who have done original research in their various fields as well as representatives of other national institutions of education, research, treatment or rehabilitation. Most of the lectures at both the Eastern and the Western sessions will be given by the same faculty. Applications for admission to the Western session will be received up to April 1, 1949, and for the Eastern session up

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to April 15, 1949. A prospectus and application blank for either session may be obtained by writing to the Executive Secretary, Summer School of Alcohol Studies, Yale University, New Haven, Connecticut.

—*New York Times*, December 2, 1948.

Pre-Employment Examinations

BUSINESS CONCERNS can save as much as half of their losses from "sick absenteeism and latent illness," DR. JOHN J. WITTMER, Assistant Vice-President of the Consolidated Edison Company of New York, Inc., said at a conference at the Commerce and Industry Association of New York, Inc., 233 Broadway, December 1. The conference, attended by 275 doctors and business men, was sponsored by the association and the Institute of Industrial Medicine of the New York University-Bellevue Medical Center, the New York Academy of Medicine and the New York County Medical Society. "The basic requirement of a good industrial health program is to introduce pre-placement physical examinations," DR. WITTMER said. "The examination is not performed primarily to determine the ability of the individual to perform work but rather to ascertain if the applicant is able to do the specific job for which he is being employed." Citing the care with which plant managers selected and maintained machinery, DR. WITTMER asked: "Is there any moral or practical reason why we should do less for the individual, without whom the equipment could not have existed, let alone be operated?" WALTER HOVING, president of the association, opened the morning meeting. DR. ANTHONY J. LANZA, chairman of the institute, presided. WINTHROP ROCKEFELLER, manager of industrial relations for foreign producing of the Socony-Vacuum Oil Company, Inc., called on doctors and business men to provide the leadership necessary to institute industrial health programs. "Business and the medical profession can merge to produce a plan by meeting in the great universities and training centers," MR. ROCKEFELLER said. "In many instances the doctors have failed to recognize the full community need. They think only in terms of caring for the sick. Business and the medical profession should be thinking in terms of a healthy community." DR. EDWARD J. STEIGLITZ of *The Journal of Gerontology*, and MARION FOLSOM, treasurer of Eastman Kodak Company, discussed the problems of advancing age. DR. STEIGLITZ said that the mental attitude and physical condition of an employee must be considered along with age when the question of retirement was raised. Dealing with the financial aspects of retirement, MR. FOLSOM said that although many individuals were

providing for later years, "it has become increasingly evident that both the employer and the Government have to step in and assist the individual." EUGENE J. TAYLOR, instructor in the Department of Rehabilitation and Physical Medicine of the N.Y.U. College of Medicine, reported that production and accident records of handicapped workers compared favorably with those of other employees. He declared that "practically every job can be performed by some handicapped person."

—*New York Times*, December 2, 1948.

Compensation Medicine

THE successful administration of workmen's compensation laws is seriously hampered by extended controversy over medical features of claims filed under these statutes, speakers agreed at the first symposium of the American Academy of Compensation Medicine on November 12, 1948. Representatives of industry, labor, insurance, government, medicine and law joined in urging the elimination of conflicts and confusion in medical evidence and greater recognition of the importance of rehabilitation for the injured worker by the practitioners of compensation medicine, DR. EDWIN P. MAYNARD, JR., Professor of Clinical Medicine at Long Island College of Medicine, recognized the existence of confusion and urged avoidance of confusing terms that belong in the domain of other specialists when making a diagnosis. He urged physicians to determine whether and when unusually strenuous or prolonged effort induced the acute symptoms of a worker's heart ailment and stressed careful inquiries into just what the patients were doing two or three days before and at the time of the attack. DR. CARY EGGLESTON, Associate Professor of Clinical Medicine at Cornell University Medical College, pleaded for the acquisition of more trustworthy information on which physicians may render judgment. He suggested that temporary awards be made to patients to tide them over and that ample time be made available to decide upon a permanent award. He indicated that the temptation of getting something for nothing might influence the claim of the patient, but that temporary awards coupled with more time would enable doctors to arrive at wiser and juster conclusions. THEODORE C. WATERS, counsel for the Industrial Hygiene Foundation of Pittsburgh, pointed out that it is impossible to reconcile medical opinions under the present standards of legal procedure. As a solution, he recommended the appointment of medical boards and consultants by the administrative agency. HENRY D. SAYER, general manager of the Compensation Insurance Rating Board of New York, stressed the importance of the doctor's testimony in disputed claims, and added, "There should be no such thing as an employer's doctor or an insurance doctor or a claimant's doctor." He held that while medicine is not yet an exact science, "the doctor nonetheless may not conjure up theories or apply principles plainly contrary to human experience or to the

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recorded observations of the medical scientists." Discussing the success and advisability of rehabilitation, DR. HOWARD A. RUSK, chairman of the Department of Physical Medicine at New York University College of Medicine and associate editor of *The New York Times*, asserted that practitioners of compensation medicine should avail themselves of the knowledge of modern techniques and programs for the rehabilitation of injured workers. Greater emphasis on returning an injured worker to his job was also stressed by EMMA S. TOUSSANT, Commissioner of the Department of Industrial Accidents of Massachusetts. She maintained that it was in a few cases only that employers could be made to realize that rehabilitation was part of the whole compensation scheme. DR. WILLARD MACHLE, Clinical Professor of Medicine, New York Medical College, discussed recent advances and effects of newer toxic agents in industry. He said some of them point up the limitation in the compensation law and also bring out weaknesses in providing reliable scientific proof of the existence of a disease or injury and the causal relationship. In those connections, he discussed deafness arising from industrial noise, occupational cancer incited by chemical agents, and injuries from radiation.

—*New York Times*, November 13, 1948.

Dr. Case Honored

DR. JAMES T. CASE, Chicago radiologist, returned from a trip to Mexico and Central America, recently, the proud possessor of the Merito Militar medal, conferred on him by the Mexican government. The presentation was made in December at a ceremony in the Military Hospital in Mexico City by General Gilberto Limon, secretary of national defense of Mexico. The accompanying citation commended DR. CASE for the good will with which over the last 20 years or more he has assisted Mexican physicians and surgeons who have come to the United States for post-graduate and specialty training. Some have served as residents under him, and he has found places for others. DR. CASE, who speaks Spanish well, has always maintained a special interest in Latin-American countries. He is the honorary consul in Chicago for the Dominican Republic, and he has lectured on radiology and surgery in Lima, Santiago de Chile Buenos Aires, Havana and Rio de Janeiro, as well as in Mexico.

—*Illinois' Medical Journal*, January, 1949.

What They Want

DOCTORS who want to hold on to their female patients are advised to pay more attention to the "little things women find so important." This was the consensus gleaned from the opinions of women of various ages who were asked to comment candidly on their family M.D.'s. The results were published in *Medical Economics*. Each woman agreed that her doctor was a pretty fine fellow, but most listed a series of irksome items. Beginning with the patient's entrance into the physician's office, they were detailed as follows: "She wants to be greeted by a friendly, understanding receptionist and nurse, rather than by an

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irritable one who rasps out an order to sit down and asks her name and ailment as though she were guilty on both counts of a misdemeanor. She wants a clean, cheerful waiting-room supplied with current reading matter, instead of with old, battered magazines that look as if somebody had teethed on them. A patient isn't particularly impressed by a lush office, the latest creation of a big-time interior decorator, because she is apt to wonder how much she will have to chip in to pay for it. Most important is a conference with the doctor before the examination to tell her what's ahead and put her at ease for coming trials. What happens too often is that the doctor suddenly descends on her with poundings and pushings and interrogative monosyllables. Since she has had no previous meetings with the gentleman, she feels most uncomfortable about this abrupt, personal introduction. She wants a dressing room with a chair, clothes hangers and a mirror, plus an illustrated posted diagram telling how to put on the examination gown. She wants to be taken seriously, have her questions answered and her worries calmed, and the diagnosis explained in words that can be understood."

for the successful treatment of...

the DAXALAN-DOME-PASTE BANDAGE TECHNIQUE...

as introduced by Dr. William M. Cooper

Director, Department of Peripheral Vascular Diseases—New York Polyclinic Medical School and Hospital

This technique is based on a 3 point program

1. Reduce the dermatitis with wet dressings of DOMEBORO TABS (Burow's Solution)
2. Combat local infection and stimulate healing with thick application of DAXALAN in the center of the ulcer and surrounding areas
3. Overcome venous insufficiency, statis, and edema by wrapping DOME-PASTE BANDAGE (Unna's Boot) around the entire leg to supply compression

for INDUSTRIAL DERMATOSES

Do What Dermatologists Do *First* in Treating INFLAMMATORY CONDITIONS OF THE SKIN!

Use a Wet Dressing...and

the wet dressing of choice is DOMEBORO TABS. Promotes faster healing because DOMEBORO solution remains in a state of constant ionization, thus rendering it capable of correcting variations in the pH values of the skin.

DOMEBORO

is the trademark for the patented, modernized form of basic

ALUMINUM ACETATE

BUROW'S SOLUTION (1:20)

DOMEBORO TABS are listed on page 376 of the "Manual of Dermatology" issued under the auspices of the National Research Council as *"Burow's Solution-Domeboro Tabs"*

DOCTOR! You may now prescribe SOOTHING Modernized — Simplified Fresh and Stable BUROW'S SOLUTION 1:20 in four forms DOMEBORO Tablets • Packets • Powder Ointment Write for samples and reprints from medical literature

DOME CHEMICALS, INC.

250 EAST 43rd STREET • NEW YORK 17, N.Y.

Penicillin in Anthrax

ABSTRACT of "Treatment of Cutaneous Anthrax with Penicillin," by J. G. Griffin, R. H. Shanahan, and C. E. DeAngelis, *New York State Med. J.*, August 1, 1948, in *The Bristol Digest*, January, 1949: "Seventeen consecutive cases of cutaneous anthrax among carpet factory employees were successfully treated with penicillin. Promptness in reporting and immediate institution of treatment are given credit for transforming a malignant infection into a rather benign infection with a relatively uneventful course. There were 16 men and one woman in the series. Since there was only a slight predominance of male over female workers in the factory, it is suggested that men are more susceptible to anthrax than women. Lesions occurred mainly on exposed parts of the body. In 10 of the 17 cases they were on the right side, probably because in righthanded individuals that side is more exposed than the left. Smears and cultures were positive in 16 cases; the seventeenth was negative on smear but a culture was positive 12 hours later. The deeper portions of the lesions contained more bacteria than surface areas. In three cases, blood cultures were made, two of which were positive. Admission temperatures ranged from 97.4° to 101.2° F, the average being 99.8°. . . . . The average number of hospital days was 12, the shortest being five and the longest 33. The average time between onset of lesion and report to the physician was two days. Doses of 100,000 to 300,000 units of penicillin were given intramuscularly every three hours, with a total average of 12.8 million units during the hospital course.

FOR MAKING WET DRESSINGS LIKE BUROW'S SOLUTION
USE PRESTO-SOL TABLETS PATENTED FORM
WITH MANY MORE ADVANTAGES
Manufacturers of:
TRANSPULMIN AMPOULES 2cc for inflammatory and Pulmonary Bronchial Affection
EUCARBON Compound charcoal tablets
Accurate uniform Dosage • No bottles, no distilled water required • A valuable addition to Medicine Chests and First Aid Kits • Antiseptic • Astringent • Stable • No lead • Economical
STANDARD PHARMACEUTICAL CO., INC., 1123 Broadway, New York

DR. PILGRIM

Now examining a new type of dictating machine, which apparently gives better results and also is portable; and trying it out in the writing of a long report, and apparently there is great facility in its use....AND concerned with laboratory work on a previous investigation, entailing a lot of microscopic examinations, and similar activities; and with many discussions concerning future meetings, and their arrangements....AND celebrating the Yuletide with the NEILSONS and the SCOFIELDS, where were much good food and drink and great merriment with banter and badinage, and also the playing of Christmas carols....AND reading a great many different types of literature including some of the mysteries, especially the "Case of the Turning Tide," and later, a summary of the Hoover Report on the great amount of waste in the medical activities of the Veterans Administration—thinking that if this be an example of governmental medical administration, then the so-called compulsory health insurance scheme is certainly doomed to failure....AND listening to the New York Philharmonic with Nathan Millstein as soloist in Tschaikowsky's Violin Concerto in D Major, which was superbly done....AND continuing with work on a long report with necessary reading, corrections, editing, and finally completing it....AND reading "Eisenhower was my Boss" by Kay Summersby and thoroughly enjoying the informal ways of the General and his apparent cheerfulness at all times ....AND for the regular periodic check-up, as to which it was said that everything was in "status quo," which was good news indeed....AND again working with problems of workmen's compensation and the construction of questionnaires and other means of getting information, which is exceedingly interesting and absorbing....AND at year's end thinking of the many things that have happened during the last year and with great plans and looking forward to much to be

AT HOME OR AWAY SPOT TESTS SIMPLIFY URINALYSIS

NO TEST TUBES • NO MEASURING • NO BOILING

Diabetics welcome "Spot Tests", (ready to use dry reagents), because of the ease and simplicity in using. No test tubes, no boiling, no measuring; just a little powder, a little urine—color reaction occurs at once if sugar or acetone is present.

Galatest FOR DETECTION OF SUGAR IN THE URINE
Acetone Test (DENCO) FOR DETECTION OF ACETONE IN THE URINE

SAME SIMPLE TECHNIQUE FOR BOTH

1. A LITTLE POWDER 2. A LITTLE URINE

COLOR REACTION IMMEDIATELY

Accepted for advertising in the Journal of the A.M.A.

Write for descriptive literature

A carrying case containing one vial of Acetone Test (Denco) and one vial of Galatest is now available. This is very convenient for the medical bag or for the diabetic patient. The case also contains a medicine dropper and a Galatest color chart. This handy kit or refills of Acetone Test (Denco) and Galatest are obtainable at all prescription pharmacies and surgical supply houses.

Acetone Test (DENCO)... Galatest
THE DENVER CHEMICAL MANUFACTURING COMPANY, INC.
163 Varick St., New York 13, N. Y.

done during the new year; and again reading the mysteries and listening to the Rose Bowl Game on New Year's Day after being served with choice viands; and again to the New York Philharmonic in Bizet's Symphony in D Major which was well done and Chausson's Poem for violin, and greatly enjoying both. . . .AND now a visit from DR. PETER PACHNER, from Czechoslovakia, having a grant from the World Health Organization to visit the United States and study various phases of industrial medicine and hygiene, with long discussion of the differences between these special phases in his country and ours; also bearing good tidings from DR. E. TOMANEK who was with PILGRIM at Harvard School of Public Health a quarter of a century ago. . . .AND taking long-distance calls from various quarters with reference to toxicological problems, and giving advice by phone, as well as conferring as to future possibilities. . . .AND overhearing one of the candidates on one of the radio programs, being a native of Donora, Pennsylvania, (where there had been some previous difficulty with the smog problem) entirely exonerating the atmospheric conditions there but blaming cigarettes for her cough!. . . .AND again at work in the laboratory preparing the field apparatus for use on a proposed survey for the coming week . . . .AND reading with great interest in the "Harvard Public Health Alumni Bulletin" the yearly report of STEVE SIMMONS, the Dean, and noticing particularly that the school now has graduates in all foreign countries and practically in all states of the Union in many different types of public health endeavor, and especially noting the statement that Harvard has supplied five of the deans of the nine recognized public health schools in this country. . . .AND concerned with going over the literature for some months past and seeking articles of interest and merit and finding a great many things of unusual type in this chronological review . . . .AND preparing for a sojourn into central Indiana where there are dust problems to be considered and investigated, and also for a later series of meetings sponsored by the Council on Industrial Health of the A.M.A. . . . AND meanwhile enjoying the mild weather, which is certain to be followed by something different.

ANTISEPTIC

*Lanelle

*U. S. PATENT PEND., U. S. REG. PEND.

Powdered Hand Soap

Antiseptic Lanelle actually kills germs on contact while being used to clean the hands. Its powerful kill action is deadly against common skin disease, infection spreading germs. Antiseptic Lanelle is non skin irritating and non poisonous.

Antiseptic Lanelle contains Lanolin, Plus another activating agent which greatly helps soothe dry, irritated skin. "Lanolin Plus" offers unmatched skin conditioning action.

Antiseptic Lanelle goes far beyond the capabilities of regular hand soaps. Antiseptic Lanelle removes the most stubborn grime, dirt, grease, paint, ink, etc., yet it is as mild and neutral as the finest facial toilet soaps. It leaves the hands really clean and conditioned, while serving as real protection against serious skin disease and infection.

Antiseptic Lanelle's germicidal, bacteriostatic, non poisonous, and non skin irritating values have been proved by unbiased tests made in America's largest testing laboratories.

Write us at once for full details on Antiseptic Lanelle Powdered Hand Soap in order that you may receive all the facts on maximum protection against skin disease, dermatitis, and infection in your plant.

SANITARY SOAP COMPANY

104 Railroad Ave. • Since 1921 • Paterson 3, N. J.

An interesting new development in inunction therapy

Because of the constant demand for an external preparation that can be safely used as a "home remedy," we have developed A-535 Rub.

A-535 Rub is intended for the symptomatic relief of those conditions for which external analgesics and counter-irritants are commonly used. A-535 contains a combination of analgesics with a high percentage of methyl-salicylate in a new type of greaseless, stainless, vanishing base, which permits ease of application and almost instant utilization of the medications.

Because home remedies are used generally, we believe the manufacturer has a dual responsibility. He must offer only such products which may safely be used in the average household and must inform the medical profession of the products' ingredients and action.

The formula of A-535 Rub is

Methyl-Salicylate	12%
Oil of Eucalyptus	½%
Menthol	1%
Camphor	1%
Base (specifically prepared)	85½%

A-535 Rub has been thoroughly tested both clinically and in over 6,000 homes. If you would like a tube of A-535, just drop us a line.

The Denver Chemical Manufacturing Company, Inc.

163 Varick Street New York 13, N.Y.

The above advertisement as to the NEW ANTIPHLOGISTINE RUB A-535 has appeared in the New York State Journal of Medicine and other medical publications.

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Reduce Absenteeism—
Combat Functional

DYSMENORRHEA

Two Ways

1. Analgesia of the cramp-like pains.
2. Relaxation of Uterine Smooth Muscle Spasm — a frequent cause of such pain.

For happier, more comfortable, **more productive** hours for your girls, suggest Hillman's D Compound. Used in industry since 1930. Send for generous Trial Supply for your First Aid Room.

Now Used In Many Leading Industries

Hillman's **D** *Compound*

—MAIL FOR FREE SAMPLES—

Hillman Pharmaceutical Co.
6300 N. Western Ave., IM-2-49
Chicago 45, Ill.

Please send FREE samples D Compound for our trial.

Name _____ M.D.

Name of Plant _____

Address _____

City and Zone_____ State_____

There are TWO Sides to the Story of Curity ADHESIVE TAPE

and *both* sides show very clearly why this adhesive tape provides greater ease of handling, and "holding-power"

ON THE ONE SIDE:

The strong, non-elastic cloth *backing* of CURITY Adhesive gives it "body." Feel it . . . it's not limp or droopy. Even a 4″ strapping can be a one-man job because it is so easy and neat to apply. It is this unique body-construction that makes CURITY Adhesive lie flat, and reduces wrinkling . . . even when it is applied to a joint or moving part.

NOW ON THE OTHER SIDE:

The skillful compounding of the superior adhesive mass gives the "stick-quick" and "stay-stuck" superiority characteristic of CURITY Adhesive. Prolonged effective support, without loosening, or peeling at the edges, is routine performance with CURITY Adhesive Tape.

EASIER ON THE SKIN? OF COURSE!

Over half a century of leadership in adhesive manufacture . . . over 15,000 skin tests during the past decade, plus careful selection of ingredients, add up to the simple conclusion, that *you cannot buy an adhesive which out-performs, or is less irritating than* CURITY Adhesive.

A product of

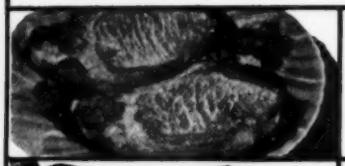
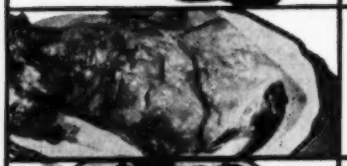
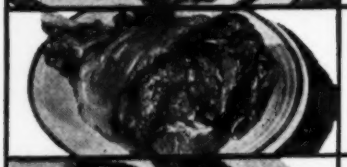
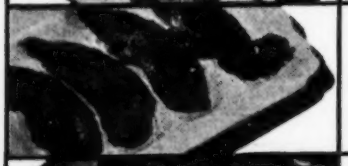
BAUER & BLACK

Division of The Kendall Company, Chicago 16

RESEARCH TO IMPROVE TECHNIC . . . TO REDUCE COST

Curity
REG. U.S. PAT. OFF.

The Abundant Nutrient Values of MEAT

KIND OF MEAT	COMPLETE PROTEIN	B VITAMINS			FOOD IRON
		THIAMINE (B_1)	RIBOFLAVIN (B_2)	NIACIN	
 PORK	EXCELLENT	EXCELLENT	FAIR	EXCELLENT	EXCELLENT
BEEF	EXCELLENT	FAIR	EXCELLENT	EXCELLENT	EXCELLENT
 LAMB	EXCELLENT	FAIR	GOOD	EXCELLENT	EXCELLENT
 VEAL	EXCELLENT	GOOD	GOOD	EXCELLENT	EXCELLENT
 VARIETY MEATS (LIVER, HEART, KIDNEY)	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
SAUSAGE (FRANKFURTERS, BOLOGNA)	EXCELLENT	GOOD	GOOD	GOOD	EXCELLENT

ALL VALUES ARE BASED ON COOKED MEATS . . MEAT ALSO SUPPLIES SIGNIFICANT AMOUNTS OF COPPER AND PHOSPHORUS

While its high content of biologically complete protein ranks meat among man's best protein sources, its contribution of many more indispensable nutrients further enhances its over-all desirability in the daily dietary.

As is readily seen in the chart above, every kind of meat is an excellent source of high quality protein and of iron. Meat further supplies significant amounts of the three B complex vitamins, thiamine, riboflavin and niacin. Certain cuts and kinds of meat are, as a matter of fact, among our richest food sources of thiamine and niacin. All meat, regardless of grade or cut, makes these contributions.

Due to the excellent digestibility of meat—from 96 to 98 per cent—the metabolic availability of its protein and other nutrients is virtually assured, making it particularly valuable in many disease conditions in which these nutrients are especially needed.

AMERICAN MEAT INSTITUTE

Main Office, Chicago . . . Members Throughout the United States

ACCEPTED COUNCIL ON FOODS AND NUTRITION AMERICAN MEDICAL ASSOCIATION

The Seal of Acceptance denotes that the nutritional statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

DERMATITIS DOWN

...after using

WEST LAN-O-KLEEN HAND CLEANSER

...with *Lanolinized* Corn Meal

Figures don't lie—and cold figures from plant after plant of every size confirm this fact: That WEST LAN-O-KLEEN is *more* than just a fast-acting powdered hand cleanser that washes away stubborn grit, grease and grime with remarkable ease and thoroughness. It's a *safety* measure that actually helps reduce industrial skin infections — thus lowering absenteeism and production costs to a notable degree. Like all sanitary products formulated exclusively by West, LAN-O-KLEEN possesses that "little something extra" that makes it *extra*-ordinary. It contains no harsh abrasives — no excess alkali to harm the skin. What's more—its fine corn meal base is impregnated with an *extra-generous amount of lanolin* — thus helping to combat the loss of natural skin oils.

Let Us Prove It Can Happen in YOUR Plant

A trial test of WEST LAN-O-KLEEN will convince you that it should be standard equipment in *your* dermatitis prevention program. Write for a sample. With it you will also receive free a booklet telling how to use LAN-O-KLEEN — and how the LAN-O-KLEEN Dispenser can save you money.

SEND FOR FREE SAMPLE

WEST DISINFECTING Company

42-16 West Street,
Long Island City 1, N. Y.

WEST DISINFECTING COMPANY
42-16 West Street, Long Island City 1, N. Y.

Gentlemen:
Please send me a free sample carton of LAN-O-KLEEN.

Name_____ Position_____

Company_____

Address_____

City_____ State_____

8

An Important Meal in Health...

Doubly Important in Convalescence

BREAKFAST skimping has no place in convalescence, since a poor morning meal may impose an impossible task on the other two meals in providing the daily nutrient needs.

A good starting point in planning breakfast for the convalescent is a widely acclaimed basic breakfast pattern consisting of fruit or fruit juice, cereal, milk, bread and butter. Other suitable foods may be added to bring the caloric and nutrient contributions to the desirable one-fourth to one-third of the day's nutrient requirements.

This pattern breakfast is rarely contraindicated. It is exceptionally well balanced as evidenced by the table of nutrient composition, and may be varied almost endlessly to provide renewed taste appeal. The cereal serving, consisting of breakfast cereal,* milk, and sugar, is an important component of this meal.

The presence of this seal indicates that all nutritional statements in this advertisement have been found acceptable by the Council on Foods and Nutrition of the American Medical Association.

CEREAL INSTITUTE, INC.

A RESEARCH AND EDUCATIONAL ENDEAVOR DEVOTED TO THE BETTERMENT OF NATIONAL NUTRITION

135 South La Salle Street • Chicago 3

BASIC BREAKFAST	TOTALS supplied by Basic Breakfast	AMOUNTS supplied by cereal serving
Orange juice, 4 fl. oz.;	CALORIES..... 611	202
Ready-to-eat or Hot Cereal, 1 oz.;	PROTEIN..... 20.7 Gm.	7.1 Gm.
Whole Milk, 4 fl. oz.;	CALCIUM.....0.465 Gm.	0.156 Gm.
Sugar, 1 teaspoon;	PHOSPHORUS.... 488 mg.	206 mg.
Toast (enriched, white), 2 slices;	IRON..... 3 mg.	1.6 mg.
Butter, 5 Gm. (about 1 teaspoon);	VITAMIN A..... 1074 I. U.	193 I. U.
Whole Milk, 8 fl. oz.	THIAMINE..... 0.52 mg.	0.17 mg.
	RIBOFLAVIN..... 0.87 mg.	0.24 mg.
	NIACIN..... 2.3 mg.	1.4 mg.
	ASCORBIC ACID.. 64.8 mg.	

**Composite average of all breakfast cereals on dry weight basis.*

Renal protection, **so urgently needed in sulfonamide therapy, is ensured two ways by *Citrasulfas** M . . .**

1 **It protectively contains two independently soluble sulfa drugs (sulfadiazine and sulfamerazine)**

and also

2 **protectively contains sodium citrate to increase urinary sulfonamide solubility**

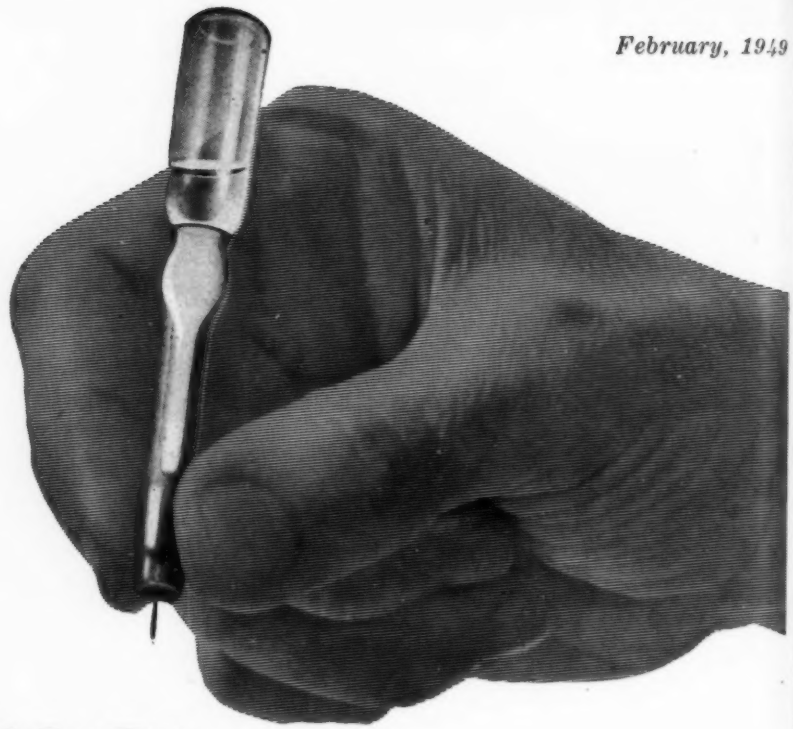
—a double guard against crystalluria.

*Trade Mark Reg. U.S. Pat. Off.

CITRASULFAS M

Upjohn KALAMAZOO 99, MICHIGAN ★ FINE PHARMACEUTICALS SINCE 1886

Every Industrial Dispensary Needs



ampins®

ampin ADVANTAGES

FOR INSTANT SUBCUTANEOUS INJECTION IN EMERGENCIES

AMPINS are syringe, ampule, solution and needle—all in a single, sterile injection unit. Simply remove needle-cover, insert needle and break tip of ampule. Controlled inert gas pressure immediately completes injection.

AMPINS are an important advance in parenteral therapy. They have a proven background with the Armed Forces. AMPINS are now available for civilian use.

1. *Whole unit presterilized, ready for instant use.*
2. *No syringe assembly or transfer of ampule contents.*
3. *No contamination danger.*
4. *Accurate dosage of filtered contents.*
5. *Tamper-proof.*
6. *No metallic corrosion.*
7. *Meets all U.S.P. requirements for injectable solutions.*

STRONG COBB & CO., INC., *Professional Products Division*
2654 Lisbon Road, Cleveland 4, Ohio Dept. IM

Please send me FREE literature and samples of AMPINS.

M. D. _____

COMPANY _____

STREET _____

CITY ZONE STATE _____

Strong Cobb & Co. Inc.
(Professional Products Division)
Cleveland 4, Ohio
PHARMACEUTICALS SINCE 1833

NEW DEVELOPMENT OF WYETH RESEARCH

New Vasoconstrictor

High in decongestant action . . .

Low in stimulant effects

The name of this new nasal decongestant is Wyamine.

In pharmacological and clinical tests, Wyamine shows high decongestant potency. Shrinkage of nasal mucosa starts quickly—3 minute average. Wyamine maintains this shrinkage well—up to 3 hours.

Extensive tests also show that Wyamine is remarkably low in cerebral stimulant effects.

No side-actions whatsoever in 85% of patients.*

Wyamine is available in an inhaler. Prescribe it wherever a vasoconstrictor with high decongestant potency . . . low stimulant action . . . is desired.

*(Side-actions in remaining 15%: Mild excitement (5%); light headedness (4%); sleeplessness —due to use at bed-time (3%); slight dizziness (3%). No returgescence.)

WYAMINE

TRADEMARK

Mephentermine

TRADEMARK

N-Methyl-Phenyl-Tertiary Butylamine

Wyeth ®

NEW DEVELOPMENT OF WYETH RESEARCH

"SMOKE LESS...OR CHANGE TO PHILIP MORRIS"

...if smokers are affected by the irritant properties of cigarette smoke

Sometimes physicians may advise "Don't smoke at all." But even where that is indicated, how many patients will forego the pleasure of smoking?

For such patients, as for *all* smokers, the choice should be the least irritating of cigarettes. Many throat specialists suggest Philip Morris* because they are convinced from published studies**, *as well as their own observations* that Philip Morris alone, of all the leading cigarettes, is by far the least irritating to the sensitive tissues of the nose and throat.

Perhaps you too will find it advisable to suggest to your patients who smoke . . ."Change to Philip Morris."

PHILIP MORRIS

Philip Morris & Co., Ltd., Inc., 119 Fifth Avenue, N. Y.

IF YOU SMOKE A PIPE . . . We suggest an unusually fine new blend — COUNTRY DOCTOR PIPE MIXTURE. Made by the same process as used in the manufacture of Philip Morris Cigarettes.

*Completely documented evidence on file.
**Reprints on Request:
Laryngoscope, Feb. 1935, Vol. XLV, No. 2, 149-154; Laryngoscope, Jan. 1937, Vol. XLVII, No. 1, 58-60; Proc. Soc. Exp. Biol. and Med., 1934, 32-241; N. Y. State Journ. Med., Vol. 35, 6-1-25, No. 11, 590-592.

How RIASOL Removes a Handicap in PSORIASIS

The man or woman with psoriasis is shouldered with a great economic handicap. He or she finds it hard to get a good job because other workers are repelled by the unsightly patches.

Many a psoriatic patient is gainfully employed thanks to the doctor's prescription for RIASOL. In most cases conscientious treatment with RIASOL helps to remove the ugly patches, and in many cases it may reduce the likelihood of a recurrence.

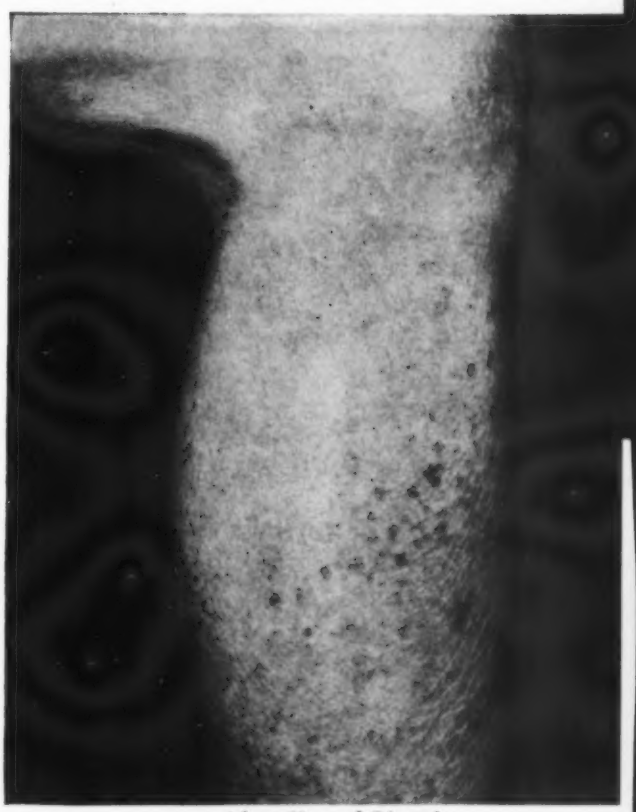
RIASOL contains 0.45% mercury chemically combined with soaps, 0.5% phenol and 0.75% cresol in a washable, non-staining, odorless vehicle.

Apply daily after a mild soap bath and thorough drying. A thin, invisible, economical film suffices. No bandages necessary. After one week, adjust to patient's progress.

RIASOL is ethically promoted. Supplied in 4 and 8 fld. oz. bottles, at pharmacies or direct.

Mail coupon for your free clinical package. One trial will convince you of RIASOL'S value as an antipsoriatic.

Before Use of Riasol



After Use of Riasol

MAIL COUPON TODAY —
PROVE RIASOL YOURSELF

SHIELD LABORATORIES IM-2-49
12850 Mansfield Avenue, Detroit 27, Michigan

Please send me professional literature and generous clinical package of RIASOL.

_____ M.D. _____ Street

City _____ Zone _____ State _____

Druggist _____ Address _____

RIASOL for PSORIASIS

Books of Permanent Worth

—Carey P. McCord

A BLIND HOG'S ACORNS—*Vignettes of the Maladies of Workers*

"....dramatizes and enlivens the industrial health field in a series of charming stories, reflecting the vast importance of this field, while entrancing the reader with the art of the true raconteur....This little biographical book tells the industrial preventive medicine story with an effectiveness that ranks with 'An American Doctor's Odyssey,' 'Plague on Us,' and 'Yellow Jack.'"

311 PAGES; ILLUSTRATIONS BY STROBEL; $2.75.

—T. Lyle Hazlett

INTRODUCTION TO INDUSTRIAL MEDICINE

The long awaited Textbook of Industrial Medicine—endorsed by The American Association of Industrial Physicians and Surgeons—nineteen chapters, each by an outstanding expert—invaluable in every phase of industrial medical practice.

253 PAGES, WITH ILLUSTRATIONS AND SUBJECT INDEX; $3.00.

—Biographical Dictionary

WHO'S WHO IN INDUSTRIAL MEDICINE

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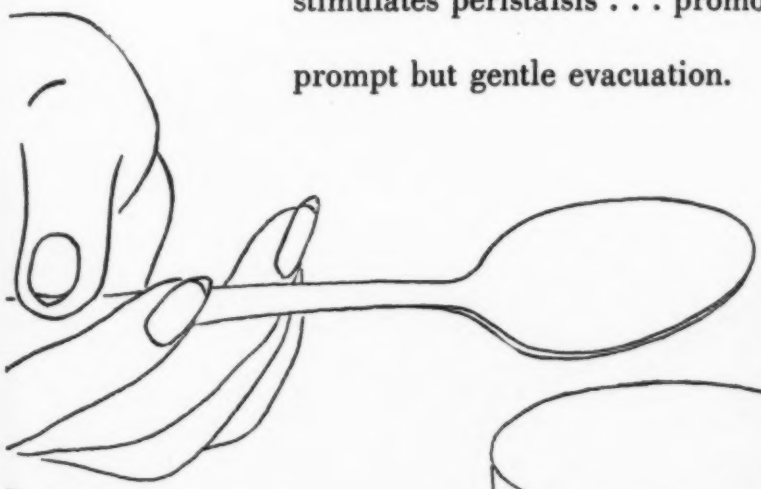

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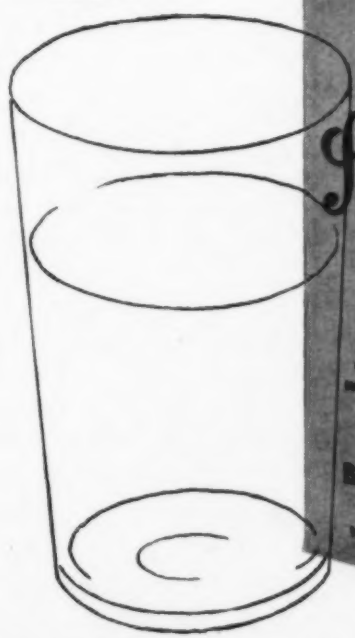
*Laxative

*Cathartic

*Average dose



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